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DECEMBER 22, 1997 VOLUME 14, NUMBER 51

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Teleport takeover?

AT&T said to be mulling buyout of local carrier. Page 8.

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Server Test Series

Compaq's ProLiant 7000 is best of the year in the enterprise class, but Dell and Sparta offer strong contenders for NT duty. Page 31.

A feast of functionality: Your guide to sorting through ATM switch options, based on The Tolly Group's tests of offerings from nine vendors. Page 28.

Microsoft IE claims prove to be overblown

By Christine Burns and Scott Lajoie
Washington, D.C.

Microsoft Corp.'s claim that stripping Internet Explorer (IE) from Windows 95 will wreak havoc for corporate users is a stretch of the imagination.

In response to a temporary U.S. District Court injunction to unbundle IE from Windows 95, the software giant last week warned that uninstalling IE 3.0 or higher from a Windows 95 desktop could make it unable to reboot.

Microsoft also said if the browser is removed, the PC cannot run Web-based components of Office 97 and other third-party applications, and end-user access to online services such as America Online, Inc. and CompuServe Corp. would be prevented.

But corporate network managers would really have to go out

See IE, page 41

Cable modem security scare

By Tim Greene

With booming demand for inexpensive broadband access to the Internet, cable modems should be cruising toward the big time, except for one big problem: security.

Cable is a shared medium, which means hundreds of neighbors share the same data pipe, making the data vulnerable to hackers using sniffers or other technologies.

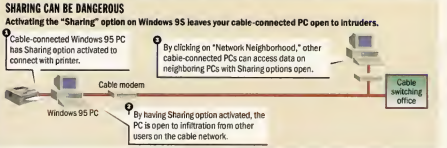
Besides the tapping threat, potential users should be aware that their PCs can be accessed by neighbors' PCs over cable nets.

Some cable providers offer security to lessen the risk, but the onus of protecting PC assets

See Secure, page 12

SHARING CAN BE DANGEROUS

Activating the "Sharing" option on Windows 95 leaves your cable-connected PC open to intruders.



Intel too pricey for thin clients

Company must cut prices, reposition older chips and add management features.

By John Cox
Santa Clara, Calif.

Intel Corp. finally has endorsed thin-client computers, but it has a long way to go before it can convince net managers to insist on "Intel Inside."

The reason is simple. Intel chips are just too expensive for Windows terminals and most network computers (NC). If it wants to play in this game, the company will have to cut prices, rechristen older Pentium chips for the thin-client market and add management and other hot new thin-client features, experts say. Only this, and a bit of luck, will make Intel chips attractive to those who build and those who buy thin clients.

Because thin clients do not run Windows, unless it is from a server, they do not need Intel or compatible chips. This has allowed a host of Intel rivals to rule the thin-client market with fast chips that sell for less than $100.

This means that network managers considering thin clients are free to choose the products that offer the best price/performance and management features, without regard to Intel instruction set compatibility.

Back to the future

Intel earlier this month announced that it was drafting design guidelines for building

See Intel, page 41

More online

- Overviews of non-Intel thin clients
- A look at Intel's thin-client plans
- An audio primer on network computing

S2|N www.nwfusion.com

From staples to diamonds: Web superstore opens for business

By Ellen Messmer
Charlottesville, Va.

A new kind of Web-based retailer officially opened its doors last week with a promise to sell top-quality products — including office supplies, televisions, diamonds and even cars — at prices that no brick-and-mortar store could ever beat.

How will the Web superstore, called Value America, Inc., pull this off? The retailer plans to build a large and loyal base of customers who join as "members" to get

See Value America, page 12

Value America — *a newfangled superstore — offers shoppers variety on its Web site.*

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PC servers* appear to be perfectly harmless. But if you tie them to the growth of your company, you may find yourself with little room to breathe. Especially when you're looking for more transaction throughput, better Web performance, and a scalable home for your key business applications. The Sun™ Enterprise 450 Workgroup Server, starting below $15,000, delivers print and file services for your workstations, thin clients and PCs. What's more, true enterprise-class solutions from Lotus® and Oracle®

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IS CUT-THROUGH ROUTING THROUGH?

Analysts say the technology is dead, but Cabletron's Wade Appelman and others say it has its place. Page 8.

THE THIN-CLIENT CHALLENGE

A new survey says moving to thin clients is hard work. Page 13.

KIVA BELIEVER

Kiva founder Keng Lim says his firm will give new parent company Netscape an enterprise boost. Page 20.

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Your guide to sorting through ATM switch options, based on The Tolly Group's tests of offerings from nine vendors. Page 28.

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To quickly get to any online info referenced in *Network World*, enter its DocFinder number in the input box on the home page.

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This Week

Only on Fusion

Keeping Current. Fred McClimans serves up a little holiday humor. Like AT&T pulling out of the local market. Oops, no, that's not funny. But the 12 Nights of ActiveXmas is.

DocFinder: 5224

Read our server reviews (page 31), then come online for complete test results in spreadsheet form. **DocFinder: 5212**

Coming up!

Get ready for next week's Fusion version of our annual Power Issue, including an exclusive interactive Power-O-Meter and added hyperlinks to background info on every article. You won't need a DocFinder for this one – it'll be all over the home page.

In January, we'll be hosting a week-long online conference on the topic: Should RBOCs be allowed into long distance? We've lined up execs from BellSouth and MCI to battle it out in a threaded discussion you can jump into. We'll provide position papers from the two companies as well as our own background articles. **DocFinder: 5218**

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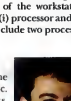
News briefs, December 22, 1997

Sun to shore up low end

In a bid to shore up its dwindling share of the low-end workstation market, Sun Microsystems, Inc. next month will announce a pair of inexpensive Solaris workstations designed to compete against systems running Windows NT, sources said. The new workstations are being built for Sun by Mitek Lab Co., Ltd., a large Taiwanese PC maker, one source said. One of the workstations reportedly will feature a single UltraSparc-II (i) processor and cost less than $5,000. The other is expected to include two processors and will cost less than $10,000.

Ipsilon bigwig lands back at Cisco


Cisco's *Lang*

Larry Lang has landed safely back at the comfortable confines of Cisco Systems, Inc. after a two-year "hiatus" at Ipsilon Networks, Inc. Lang, formerly director of product management at Ipsilon, now is a vice president in Cisco's Service Provider business unit. IP switching pioneer Ipsilon was acquired two weeks ago by Nokia Corp.

Trio of industry giants boosts clustering spec

Three major computer companies last week released the first version of a specification that will promote clustering between different platforms. Dubbed Virtual Interface (VI) Architecture 1.0, the specification will define links between otherwise incompatible applications and Web servers. Intel Corp., Microsoft Corp. and Compaq Computer Corp., have spearheaded the nine-month collaboration of more than 100 companies on the spec. Software and hardware products utilizing VI Architecture are expected to ship in the first quarter of next year.

Users to pay piper for school Internet subsidy

AT&T last week announced it will impose a 4.9% surcharge on most interstate voice and data services beginning in February to help pay for the new E-rate program. E-rate is a subsidy for elementary and secondary schools, libraries and rural healthcare providers to help them obtain Internet access and other network services. It was ordered by the Federal Communications Commission in May and takes effect Jan. 1. AT&T agreed not to impose a residential E-rate surcharge after the FCC reduced the maximum amount to be collected during the program's first six months.

IBM buys Christmas present for Tivoli

IBM last week said it plans to acquire help desk vendor Software Artistry, Inc. in a cash deal valued at $200 million. Software Artistry will become a business unit of IBM's Tivoli Systems subsidiary.

Come and get your red-hot HTML

Web developers can begin using the latest version of HTML in the wake of last week's approval of a specification by the World Wide Web Consortium (W3C). In recommending HTML 4.0 as a spec, the standards body has indicated that the new version of the Web's publishing language is stable, contributes to Web interoperability and has been approved by all W3C members. One W3C official said HTML 4.0 includes improvements to forms and tables as well as support for cascading style sheets, which give Web designers more flexibility in creating the look and feel of pages.

Mark your calendars!

5 2 1 8

This Cabletron guy heads to Nasdaq offline in the final Network World Fusion Face-off Jan. 12 to 16. Executives from the two companies will joust while you jump into the discussion with questions and comments.

Go online for more details.

www.nwfusion.com

Cabletron cuts file customers

Layoffs have users wondering about the internetwork company's future.

By Robin Schreier Hohman
Rochester, N.H.

Cabletron Systems, Inc. this year acted like a bit of a Grinch by laying off 600 people, nearly 10% of its work force, one week before Christmas.

Engineers were included in the reduction, but a Cabletron spokesman refused to break down the layoffs by job. The company also closed two facilities, one in Nashua, N.H., and the other in Andover, Mass.

By the end of last week, rumors of takeover, sellout and further downsizing were swirling around the company, based here. Although Cabletron has denied that the company is for sale or that there might be more layoffs, some customers are concerned.

"If we see the trend continue, I will become worried because it will affect [Cabletron's] ability to conduct research and development," said Roland Voyages, director of Technical Services at NationsBanc Montgomery Securities, Inc., in New York. "I wish they would be a little bit more forthcoming with information so we can make better decisions."

Voyages also is disappointed with some of Cabletron's recent deliveries. "We have seen a demonstrated problem in delivery of software and firmware for high-end switches," he said.

For instance, Voyages has been waiting for more than a year for port mirroring. "If they're laying off engineers, that's got me alarmed because it will be longer before we see the results," he said.

Asked when he expects Cabletron to deliver port mirroring, Voyages said, "I have stopped believing them."

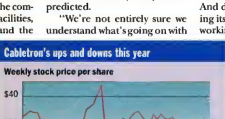
Other customers, however, see the restructuring as an industry trend. "They're just a little later than everybody else," said James Wiedel, director of networking at the University of Southern California.

A Cabletron spokesman said the layoffs were needed to bring expenses in line with revenues. Cabletron had a clean earnings record from the time of its 1989 initial public offering until two quarters ago. It now has seen two consecutive bad quarters, which brought its stock to less than $14 per share. The 52-week high was $46.

The third-quarter results, scheduled to be released today, were expected to show revenues of about $335 million, close to what many analysts had predicted.

"We're not entirely sure we understand what's going on with Cabletron just yet, and I'm not sure the company understands just yet," said Noel Lindsay, a business analyst at Deutsche Morgan Grenfell, in San Francisco. But, he added, "I don't think you can fix a business by just laying people off."

Cabletron's ups and downs this year



Think positive

On a positive note, Cabletron named the former manufacturing guru at Gateway 2000, Inc., as executive vice president of Worldwide Operations. John d'Auguste, who was vice president of operations at Gateway from April 1993 to February 1997, is credited with turning around Gateway's production fulfillment cycle, helping to make it a leading direct-sale vendor.

At least part of Cabletron's problems can be attributed to its moving from hubs to switches, which has been painful at times. And despite Cabletron positioning itself as "The Complete Networking Solution," it does not manufacture routers.

That has led some to speculate that Cabletron might consider buying start-up router vendor YAGO Systems, Inc.

Cabletron also expects to expand its partnership with Northern Telecom, Inc. That has led to strong speculation that Nortel would find it attractive to acquire Cabletron, especially since Lucent Technologies, Inc., two weeks ago bolstered its Ethernet line with the acquisition of Gigabit Ethernet start-up Prominet Corp.

Cabletron denies both acquisition scenarios. ■

CORRECTION

Due to a reporting error, a story on page 19 in our Dec. 8 issue incorrectly described a Cabletron SmartSwitch 9000 switching module. The module offers 24 dedicated 10M/100M hit/sec Ethernet ports.

Be a NET KNOW-IT-ALL

For the answer to this week's question and more net trivia, visit Network World Fusion and enter 2349 in the DocFinder box.

This week's question:

Earlier this month, Lucent agreed to buy Gigabit Ethernet vendor Prominet for about $200 million. Is that more or less than what Cisco paid last year for Gigabit Ethernet start-up Granite Systems?

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AT&T to tie the Teleport knot?

Company raises money for possible buys of other alternative local carriers.

By David Rohde
New York

AT&T appears to be ready to ditch its failed strategy of entering the local market by reselling existing carriers' lines.

The long-distance giant reportedly is considering acquiring prominent alternative local carrier Teleport Communications Group, Inc. The move instantly would propel AT&T into 58 markets for local business services, giving AT&T its first meaningful local facilities since the enactment of the Telecommunications Act of 1996.

An AT&T/Teleport merger would produce head-to-head competition with the pending combination of MCI Communications Corp. and WorldCom, Inc. in the local and long-distance markets. The move also would reinforce AT&T and MCI's increasingly intense rivalry over Internet access services.

Under the deal, AT&T would add Teleport's business-oriented CERFnet Internet subsidiary to its own growing stable of WorldNet Internet services. CERFnet and AT&T WorldNet have unveiled virtual private network offerings over the past month — as has MCI.

An AT&T/Teleport combo is by no means certain. Teleport's stock price has been soaring recently, giving it a market value of more than $10 billion. And AT&T's historic difficulty closing deals could only make Teleport even more costly to acquire if Teleport's stock continues to rise, analysts said.

An even bigger hurdle may loom for AT&T's board. Regional Bell operating company executives seeking entry into the long-distance market have been hammering AT&T and MCI for failing to promote their local services to residential customers. A deal to acquire Teleport, which only serves business users, could reinforce the criticism.

"It's a big political hurdle for AT&T," said Steve Sazegari, president of Tele.Mac, a telecom consulting firm in Foster City, Calif. AT&T may wait to present a Teleport deal until it has a companion deal addressing the residential market, such as an agreement to help cable TV companies upgrade their networks for two-way telephony, Sazegari said.

AT&T also reportedly is talking to other buyout candidates, such as WinStar Communications, Inc., a provider of wireless local loop capacity.

Analysts said a move is likely as early as the beginning of 1998 because AT&T has been rapidly raising huge sums of money from non telecom-related assets. Last week, Citicorp agreed to pay $3.5 billion for AT&T Universal Card Services.

Analysts also said new AT&T Chairman and CEO C. Michael Armstrong is ready to reverse former CEO Robert Allen's strategy of relying on the resale of local services to build market share against the RBOCs. Even Allen's protégé John Zeglis, now Armstrong's No. 2 man as AT&T president, last month conceded that AT&T had suspended resale marketing after entering only six states. ■

LINING UP THE ASSETS

Assets	What AT&T has	What Teleport would give AT&T	What MCI/WorldCom would have***
U.S. local facilities-based networks	1*	58	83
European local facilities-based networks	0**	5 (through pending acquisition of ACC)	12
Internet points of presence	955	28	2,900
Fixed wireless local loop	Pending tests in Chicago	200 licenses (through acquisition of BizTel)	Nothing

* AT&T has a local network in Chicago. **AT&T is part of a joint venture with an alternative carrier to build networks in Germany.

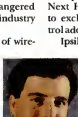
***The data on MCI/WorldCom takes into account pending acquisitions of Brooks Fiber, ANS Communications and CompuServe Network Services.

Cut-through routers face uphill battle

By Jim Duffy

Cut-through routing technology, such as that embodied in IP switching, is an endangered species, according to industry analysts.

With the emergence of wire-speed gigabit routers, many observers are proclaiming the death of cut-through and the rebirth of traditional routing. Nokia Corp.'s acquisition two weeks ago of IP switching pioneer Ipsilon Networks, Inc. for the underwhelming price of $120 million gave a ring of truth to those decrees.


Cabletron's *Appelman*

Despite the dire predictions, switch vendors said they will still develop, enhance and offer cut-through routing products.

Cut-through routing attempts to increase the performance of internetworking by taking the hops out of routing.

Ipsilon, Cabletron Systems, Inc. and 3Com Corp. were vanguards of cut-through routing with their respective IP switching, SecureFast Virtual Networking and Fast IP.

IP switching routes packets until a long-lived flow is detected, then switches subsequent packets. SecureFast forwards packets over connection-oriented virtual circuits established through authorization policies. Fast IP uses the Next Hop Resolution Protocol to exchange media access control addresses across subnets.

Ipsilon generated most of the excitement around cut-through switching with its IP-familiar approach and "take on Cisco" marketing tactics. But IP switching never sold because of its immaturity and proprietary nature. Analysts said this also is true for other cut-through techniques.

"Overall in the industry we've seen the failure of all these new 'route once, switch many'-type technologies to catch on," said Eric Hindin, program director at market research firm The Yankee Group, in Boston. "It appears that traditional routing is winning the battle."

This is because traditional routing no longer requires a software function in traditional routers. It now is done on high-speed, low-cost Application Specific Integrated Circuits in a new generation of Gigabit Ethernet switches and gigabit routers.

"Cut-through is basically dead compared to the gigabit, wirespeed [routing] in hardware," said Dave Passmore, president of Decisys, Inc., in Herndon, Va. "It's certainly not the long-term direction in the industry."

Perhaps. But it certainly is not dead, said Wade Appelman, director of advanced product engineering at Cabletron, who claims 1,500 sites are using SecureFast. "There [are] markets for both applications," Appelman said. "I do still see a trend within the enterprise where they are still trying to use traditional switching [to] flatten [networks] out a little bit" to reduce complexity.

But these flattened nets will run into scalability constraints and Cabletron has hit these limits with SecureFast. Traditional routing is needed to connect cut-through domains and that is where Cabletron's investment in gigabit router start-up YAGO Systems, Inc. comes in, he said.

Users seem to be in no hurry to take advantage of cut-through, though.

"We haven't done any production deployment of it," said Bob Currier, director of network communications at Duke University, in Durham, N.C. "We're a pretty open environment, and in order to really make that work you've got to have [a single vendor] all the way." ■

IBM refines search techniques

By Marc Songini
Santa Teresa, Calif.

IBM wants to help enterprise users find what they are looking for.

With that goal in mind, the company next year will announce Content Connection software. The package works with existing Web browsers or Lotus Development Corp.'s Lotus Notes clients to help users more easily search for and find specific types of data across the Internet or an intranet.

Content Connection will come with a Java Beans tool kit and code that will enable it to connect to enterprise back-end repositories.

With the package, users will be able to create customized agents that can in turn go out and search, index, gather and transmit audio, video or data over IP- or Internet Inter-ORB Protocol-based environments.

"Content Connection takes a request and performs intelligent mining, searching and categorization," said Larry Bowden, director of content management marketing at IBM.

Content Connection, currently in beta, bears some similarity to a search technology recently announced by IBM called Grand Central Station (NW, Nov. 10, page 1).

Grand Central Station, however, is a more generic search tool; Content Connection is tweaked specifically to mine out certain types of Web data, Bowden said.

For example, a user in an enterprise net at a bank could make a request for information on a company or individual.

"You can say, 'Find me information on a particular person.' The [Content Connection] agent will retrieve letters written to the customer, bills, audio records, videos — all the information on a single person in all different media will be retrieved at the same time," Bowden said.

The bottom line is that products such as Content Connection and Grand Central Station will save users from having to sort through the tons of data generated by traditional search engines.

Content Connection pricing and availability are not available. ■

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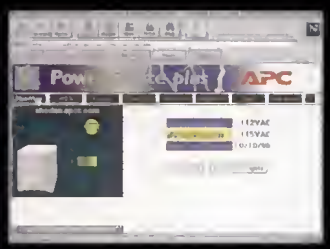
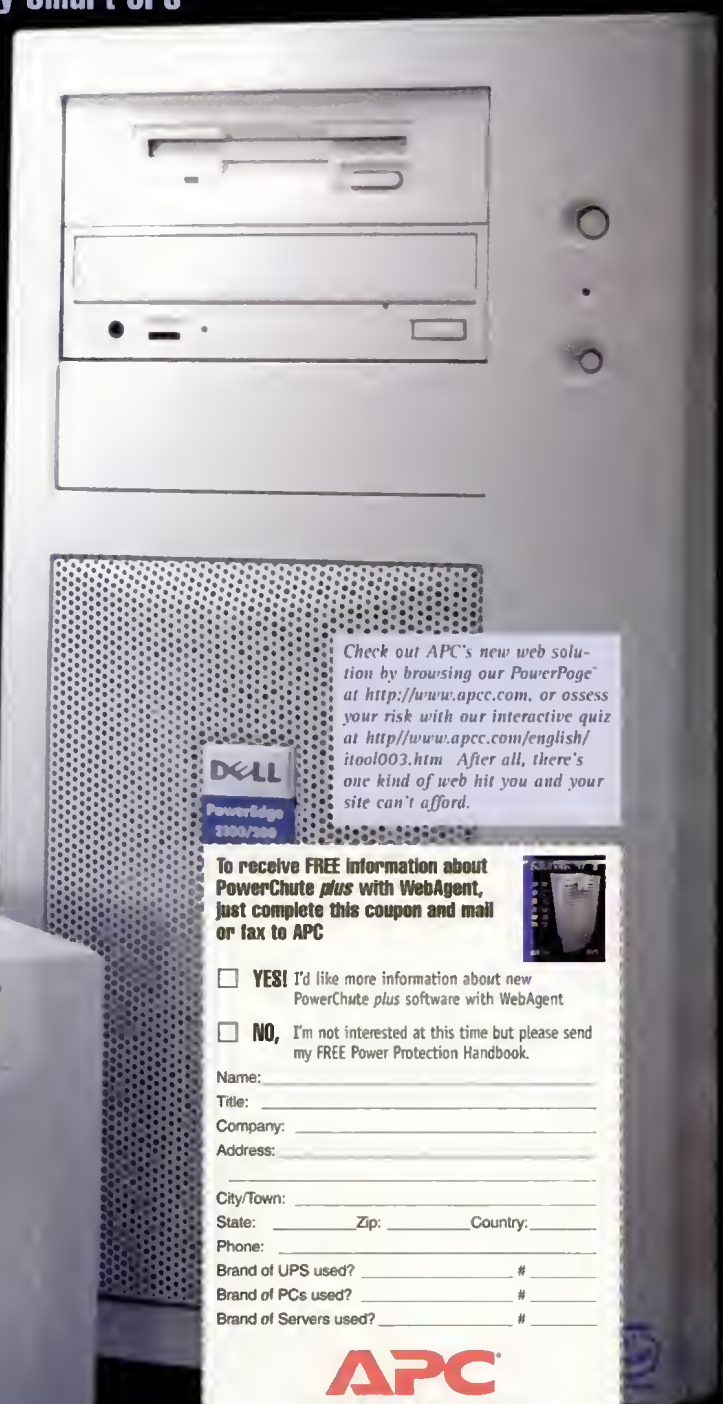


Smart-UPS now ships with PowerChute plus power management software with WebAgent, to make Smart-UPS browser-manageable. (Ships free with 120V Smart-UPS only.)



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Circle Reader Service #1

Holiday e-cards going corporate

MIME and HTML Mail technologies help legitimize electronic greeting cards.

By Paul McNamara

'Tis the season to learn that e-mail greeting cards are not just for friends and family anymore.

That is this year's holiday message from companies such as Greet Street, Inc., Hallmark Cards, Inc. and a growing list of opportunistic online entrepreneurs offering such cards.

The e-cards, some of which are animated, depict traditional holiday scenes and themes, garnished with the sending company's name and corporate logo.

Technological advances in e-mail, such as ubiquitous Multipurpose Internet Mail Extensions-enabled clients and HTML Mail, are turning holiday e-cards into a legitimate business tool. So even if you have not received many of these cards at work this month, count on getting plenty in 1998.

If you are sending the cards, also count on a few "bah, humbugs" from people who would just as soon keep their business in-boxes clear of such clutter.

Besides better technology, the e-card trend is being driven by a groundswell of demand from corporate America, at least according to one online card provider.

"We had sort of a knock on the head from people saying, 'Hey, we really want to use this for business,' " said Elizabeth Cox, promotions manager for San Francisco-based Greet Street, whose online E-greetings have primarily catered to consumers. "We started thinking, 'Why can't we make it easier for companies to use our service and also get [them] company branding?' "

Toward that end, Greet Street is developing a corporate service called Keynotes, which will allow companies to establish password-protected accounts for sending customizable e-cards to large numbers of recipients. Greet Street already handles special requests for e-mailing virtual cards from companies including retailer Sharper Image Corp., of San Francisco; Garden Escape, Inc., an online garden supply seller in Austin, Texas; and the Internet Commerce Expo (ICE), a Framingham, Mass.-based trade show organization.

Holiday e-cards, *such as the one pictured on the left, are becoming all the rage among companies seeking to reach out to customers and partners.*

"[E-greetings] have been a great success with us," said Will Green, conference director for ICE. "We've used them as a business tool, as well as really just to keep in touch with our customers and [show] speakers."

Green said he expected to send up to 1,000 E-greetings this holiday season, simply by providing Greet Street with a database of names and e-mail addresses. The cards arrive as .GIF file e-mail attachments, which, if unreadable to the recipient, also can be accessed at a dedicated URL.

The price is right, Green said, since Greet Street charges 50 cents per card and offers volume discounts. "It has cut our costs [for cards by] 50%," he added.

However, just as with paper greeting cards, there is a risk of getting *too* personal with the electronic greetings, according to those who peddle them.

"The company has the ability to limit the images that are available to its employees when they access the corporate account, Cox said. "Some things are not quite appropriate for business."

For example, check out the e-cards featuring hikini-clad Santa's helpers, which can be found at other e-card sites.

Such concerns aside, Cox believes it is only a matter of time before e-cards become all the rage.

"Down the road, when everybody is sending [e-mail cards] and you get a paper card from someone, you'll think they are lame," she said. ■

Domain names null and void?

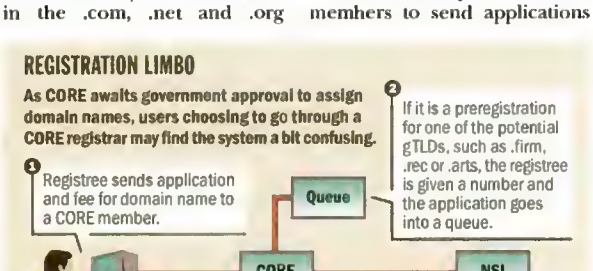
By Sandra Gittlen

Users are signing up for a slew of new Internet domain names — even though there is no assurance that the domains will ever go live.

A group of companies selected by the Internet Society (ISOC) and the Internet Assigned Numbers Authority to register new names in such domains as .firm and .web has already accepted several hundred applications — and application fees.

The new generic Top Level Domains (gTLD) are slated to become operational in February. But there is one problem: The federal government, which still oversees domain naming in the U.S., has yet to sign off on the plan.

A group of federal agencies are discussing what to do about domain registration, in an effort headed by Ira Magaziner, President Clinton's top Internet advisor. Among the issues is how to formally and finally hand domain naming off to the private sector. Network Solutions, Inc. (NSI) currently doles out names in the .com, .net and .org domains under a government contract that expires in March.



The would-be new registrars, collectively known as the Council of Registrars (CORE), have come under fire for accepting money for domain names they might not be able to give out. "It was never clear that the whole regime had any authority. Yet [CORE] went ahead and collected money," said Tony Rutkowski, former ISOC president.

The CORE plan calls for members to send applications to a central database that will automatically accept or deny domain name requests based on availability.

CORE says that people who sign up now should get their choice of domain names. But because the central database is not yet operational, there are no guarantees.

One CORE member, Atlanta Internet service provider Mindspring Enterprises, Inc., has held off on preregistering users for the gTLDs because of all these issues, according to Ed Hansen, a spokesman for the company. "The domains have not been approved, and the methodology for registering people has not been approved," Hansen said. "They are asking you to take a chance, and there should be some guarantee of protection for the customer."

Hansen said this could include a promise of a refund or clear instructions as to the condition of the registration process. He urged other CORE members to keep registration money they are receiving in escrow in case the process is not approved.

"It's a crapshoot," Hansen said of Mindspring's investment in CORE. But the opportunity to provide domain name registration as part of their Internet services was too good to pass up, he said. ■

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Users doubt Lotus service stride claims

By Paul McNamara
Cambridge, Mass.

An 8-month-old campaign by Lotus Development Corp. to shake its reputation for providing lousy service and support is well on its way to success, the company claimed last week.

Lotus claimed to have achieved dramatically shorter telephone "hold" times and better incident resolution rates by instituting new procedures, hiring hundreds of support personnel and contracting with outside partners (see graphic).

However, a random sampling of customers indicated that the road to widespread satisfaction may prove bumpier than Lotus would like.

SIGNS OF PROGRESS

As part of a service and support push that began in the spring, Lotus claims to have:

- Reduced telephone "hold" times from an average of more than 10 minutes to less than 1 minute for enterprise customers.
- Increased the number of incidents resolved during the initial customer contact by 50%.
- Added 300 support workers to a base of 1,100.
- Established relationships with 65 new authorized support providers.

"Lotus support for the most part is terrible," said Jim Santiago, Lotus Notes manager at Beacon Properties Corp., a Boston-based real estate investment firm. "The only changes I have noticed are the support person gives you the incident number and his or her telephone number.

"The problem is that the telephone number is the voice mail number, and they usually call back when it's too late," Santiago added.

Another customer noted some improvement, although he also remains unimpressed overall. "[Telephone] hold times have gotten better" and response to emergency problems has been good, said Jerry Fain, IT manager at Winter, Wyman & Co., a recruitment firm in Waltham, Mass.

However, routine requests for help continue to be an exercise in frustration, Fain added. "The next time that support contract comes in, I will have to really think hard about whether I want to [renew]."

Several Lotus customers complained about support personnel who simply were unable to answer their questions.

"I tried to get help for a Lotus Approach [database] problem — it wouldn't recognize any [Lotus] Notes files — but they could not help," said Tom Sullivan, a quality engineer at Eastman Kodak Co., in Rochester, N.Y. Sullivan said he has "given up calling" and instead relies on the Lotus Web site and newsgroups for routine help.

Lotus officials are confident these critics can be swayed.

"As much of a challenge as it is for us, I think we have the ducks in a row, we've got the will and we absolutely have the resources," said Jim Krzywicki, vice president of worldwide customer support and education. "It takes time."

Being an IBM subsidiary will help, Krzywicki said. "We have an enormous strength in our parent company and they have taught us a lot," he said.

At last January's Lotusphere customer conference, IBM CEO Louis Gerstner elicited a vigorous round of applause by promising to fix whatever was ailing Lotus' service and support operation. ■

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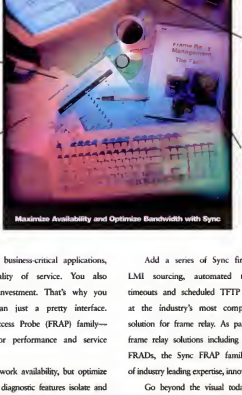

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Circle Reader Service #6

Sun, Intel find common ground

Solaris operating system to run on Intel's planned 64-bit Merced processor.

By Scott Lajoie
Santa Clara, Calif.

Intel Corp. and Sun Microsystems, Inc. last week said they have formed a broad alliance that perhaps someday will be known as "Suntel."

The companies have agreed to ensure that new versions of Sun's Solaris operating system make optimal use of Intel's 64-bit Merced microprocessor technology, which will debut in 1998.

The technology combination should "validate Solaris as the leader in network software . . . and as a powerful alternative to NT," said Janpieter Scheerder, president of Sun's SunSoft businessunit.

Scheerder said Sun is confident that OEMs and software developers will build more hardware and write more software for Solaris now that Sun and Intel are working together.

While industry analysts say Windows NT is outselling Solaris and other versions of Unix as a server operating system, Unix software still holds a big scalability edge over Microsoft Corp.'s offering. Solaris, for instance, can run on symmetrical multiprocessing boxes with up to 64 processors, whereas most high-end NT servers max out at eight processors.

According to Scheerder, the agreement does not alter Sun's hardware strategy, and the company will not start selling Intel-based systems. Sun remains committed to its own 64-bit scalable processor architecture (SPARC) microprocessor, he said. ■

Secure

Continued from page 1

from cable intruders in many cases will be placed on the user, experts say.

Despite the risks, the lure of 1.5M bit/sec throughput for less than $50 per month is strong, as indicated in 1997 by the tenfold increase in North American cable modem users to 100,000.

That number is expected to double by mid-1998, according to Kinetic Strategies, Inc.

But cable modem security issues loom.

Microsoft Corp., in fact, is warning Windows 95 users that the simple act of sharing files with a printer can open your PC and all your personal and business files to prying eyes if the PC is connected to a cable TV network.

Microsoft's recommendation is: shut off the share option on the PC.

Danger on the wire

Beyond the risk of your PC being cracked, data traversing the cable network can be captured by protocol analyzers that your network neighbors might use to sniff traffic as it whizzes by, said Bill Hancock, a security expert with Network-1 Software and Technology, Inc.

That is why Dr. John Borden, president of JABR Technology Corp., a consultancy in Boston, is beefing up cable security in preparation for a New England Medical Center remote access trial. Doctors at home plan to fetch brain scans across the Internet and cable links.

If successful, the trial will be expanded to other hospitals, Borden said.

He is calling on upstart Assured Digital, Inc., of Littleton, Mass., which specializes in cable network security. Assured Digital makes cable modems that encrypt traffic using DES and triple DES and hashing technologies.

While Borden is working out security on his own, cable providers, sensitive to their customers' vulnerability, also are taking steps to plug leaks.

MediaOne Group, the cable company owned by US WEST, Inc., puts filters on its cable modems. The filters make customers' PCs invisible to each other across the cable network, according to Kip Compton, director of Internet systems and services for MediaOne.

Additionally, MediaOne offers most customers a filter. As a default, the filter blocks all outside access but the customer can disable the filter to allow access to the PC or only certain files, Compton said. That would let customers remotely reach work from their home PCs.

Access from the cable network also can be password-protected.

Data security on the cable network can be reinforced by tunneling technology that encrypts IP packets and encapsulates them for transport across IP networks.

The encryption that secures IP traffic from client to host will pose as much trouble for hackers on the cable network as it would for hackers on the Internet, according to Digital Equipment Corp.

Digital is giving its work-at-home employees cable access over the Internet to corporate LANs, protected by AltaVista Tunnel 97 software.

Boston College embraced cable modems two years ago for its campus network. The college owns the cable, so the only security threats come from within, and they are dealt with through the honor system. "We're not stopping it, we're only policing it," said Randy Titchner, the college's manager of network and desktop services. ■

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Value America

Continued from page 1

discounts and frequent-buyer dollars accredited to their Web accounts. Value America transmits product purchases directly from the World Wide Web to manufacturers via electronic data interchange to avoid the expense and time of paper-based order handling.

"This is the first completely automated paperless commerce application," proclaimed CEO Craig Winn, as he inaugurated the Web site that his team of about 100 techies and editorial types have worked on for nearly two years. "It costs the manufacturer less to ship the order to the customer than to ship to a store."

Winn, who possesses the indefatigable optimism of a Dale Carnegie, arrives on the 'Net with business experience as the founder of The Winn Co., a manufacturers' representative firm. However, his company lacks the street presence of a retailer such as Wal-Mart Stores, Inc.

Winn is an ardent believer that a personalized, albeit automated, form of electronic commerce on the Web is "the next revolution in retailing." He also has convinced 300 brand-name manufacturers, including 3M Corp. and Zenith Electronics Corp., to participate in his venture.

Value America will not say how much it has sunk into its business. But Winn, who last week took out a full-page ad in *USA Today* to promote diamond sales on the 'Net, claimed he will spend $150 million in advertising alone over the next 18 months.

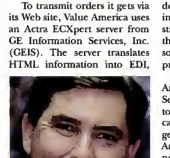
Value America, which lets the Web visitor shop by product category, special sales or brand name, wants to personalize shopping. For instance, customers could set up dates throughout the year to have flowers delivered to a list of people. The Web site also sends out a continual IP-based audio stream to accompany marketing text aimed at shoppers sitting at speaker-equipped PCs.

In a bid to become the primary Web site for office products on the Web, Value America is offering a $75,000 line of credit to small businesses that use ValueAmerica.com.

The net behind the store

The hard job of building the Value America superstore has fallen largely on the shoulders of Joseph Page, the company's executive vice president and chief technology officer.

To transmit orders it gets via its Web site, Value America uses an Actra ECXpert server from GE Information Services, Inc. (GEIS). The server translates HTML information into EDI,



Value America's Craig Winn: *"By next fall, the personal servant on the Web site will be voice-activated, repeating what you said back to you and taking you [to the appropriate place]."*

sending the information to manufacturers via the GEIS value-added network or the Internet.

"We keep track of all our suppliers' EDI mappings," Page said. "We do have some trading partners that don't do EDI, and ECXpert allows them to go through Web forms to send an EDI transaction to us."

Suppliers electronically message Value America an acknowledgment for every order.

The Value America store design is based on Microsoft Corp.'s Merchant Server 1.0, an electronic storefront for catalog management and order processing. The server software, running on four 266-MHz Pentium processor-based machines, can dynamically generate HTML pages according to a programming template.

Dynamic HTML pages have made it easy for Value America's editors working at their PCs to send text and graphics to the retailer's Web server. If design changes are needed, Page said he "can make the changes once, and it will change every page instantly."

But Merchant Server has proven inflexible because it defines terms such as order inventory and shipping too strictly, Page said. In response to these types of complaints, Microsoft last May discontinued the product.

Within a few months, Value America will transition to Active-Server Pages on NT, a Microsoft tool that lets programmers set up calls to back-end databases to generate dynamic HTML. Value America has written its own business-processing engine.

Most Web shoppers who visit Value America are expected to use Microsoft's Internet Explorer or Netscape Communications Corp.'s Navigator browser. For the application development team at Value America, this has meant building a Web site capable of determining which browser is present and acting accordingly.

Security, of course, is of paramount concern for Value America and its potential customers. At present, the retailer is not storing credit card numbers, but uses CyberCash, Inc. software to process them, immediately handing card numbers to a third-party vendor.

Once the retailer has further security mechanisms in place, such as encrypted databases, Value America plans to store card numbers. ■

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Briefs

■ **Symantec Corp.** *is shipping a new version of its Norton Utilities Windows 95* **PC management software,** *which features enhanced diagnostic and disaster recovery services.*

Norton Utilities 3.0 includes WinDoctor, a stand-alone utility that monitors, detects and fixes problems with the Windows 95 registry, system files and software applications.

This version also includes a fully integrated recovery tool, CrashGuard 3.0, which runs in the background to prevent crashes and wayreeze applications without user intervention.

Norton Utilities 3.0 costs $79 per desktop machine.

℅ Symantec: (800) 441-7234

■ **Compaq Computer Corp.** *has become the first hardware vendor to have its Fibre Channel Storage System certified on Windows NT Cluster Server, Microsoft's two-node clustering software. The* **fiber channel connection** *between the two NT nodes allows them to be located farther apart than allowed by the SCSI storage connections shipping with existing NT certified clusters. Compaq's Fibre Channel Storage System will ship early in 1998.*

℅ Compaq: (281) 370-0670

■ **NTP Software, Inc.** *last week announced software that will give administrators granular control over Windows* **NT server disk storage** *space. NTP Software Quota Manager for Windows NT lets managers limit the amount of disk space individual users are allowed to consume on networks' NT servers.*

Available now, NTP Software Quota Manager for Windows NT is priced at $795 per server.

℅ NTP: (800) 226-2755

Getting thin is not easy

By John Cox

An in-depth study of seven big U.S. companies reveals major obstacles to adopting thin-client devices.

Onsite reviews by Concours Group, of Kingwood, Texas, found that a hazy idea of real end-user computing costs, coupled with bureaucratic unwillingness in MIS groups to embrace a non-Windows desktop, is making thin-client computing a difficult choice.

Yet Concours found that every one of the seven companies studied could benefit from using some type of thin client. Among its recommendations: Identify applications that lend themselves well to thin clients; don't try to get so-called power users of PCs to switch to thin clients; run a rigorous pilot test; and keep the deployment as simple as possible.

After two-day visits to each of the seven companies, the Concours analysts outlined the largest obstacles.

Organizational inertia is a major stumbling block to thin clients. "There's a very strong institutional momentum in favor of the PC, which helps to explain why companies are not choosing the thin-client model, even though it can be shown that it will save a lot of money," said Ed Roche, vice president of Concours Group. "There's a lot of work involved in making a change."

Although it was not part of the Concours study, that fits the experience of Bell Mobility, the Toronto wireless subsidiary of Bell Canada. The company is using Citrix Systems, Inc.'s WinFrame multiuser NT as an application server for stripped-down 486-based PCs, said George Morris, technology planner for the telephone company.

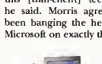
Microsoft Corp.'s recent launch of the beta test for Microsoft Windows-based Terminal Server has caused confusion and uncertainty in MIS groups, Roche said. "They're not sure where Microsoft is going with this [thin-client] technology," he said. Morris agreed. "I've been banging the heck out of Microsoft on exactly this issue," he said. "I've told them, 'Hey guys, please start getting your message out there.' "

Thin-client costs varied at the companies, depending on the technology assumptions and designs made by the MIS groups, the Concours study found. MIS needs to remember that the name "thin client" includes the desktop device, possible changes to the network infrastructure, the servers, all software, administration and support.

Finally, the Concours study also found that these companies had very little hard information about the soft end-user costs — lost productivity due to a broken PC hard drive or from a glitch in a software upgrade — of their current environment. The result is that MIS groups cannot point to hard, and dramatic, savings with thin clients, Roche said.

But Bell Mobility can because measuring call center productivity is vital. In 1996, the telco found call center productivity jumped 300% to 900% after installing WinFrame servers.

Concours concluded that many companies could start migrating to thin clients by equipping existing Intel 486-class PCs with software that will let them act as a thin client, accessing Unix servers, mainframes or NT application servers. It worked for Bell Mobility. ■



CASE STUDIES SHOW BIG OBSTACLES FOR THIN CLIENTS

Making the shift from PCs to network computers or Windows terminals presents major problems for companies. Concours Group recently conducted in-depth, onsite reviews at seven large companies. Among the problems uncovered are:

- Desktop savings are somewhat offset by new, bigger server costs.
- Poor thin client design decisions by MIS can cut anticipated savings.
- The Java language and Java applets are still immature, so users rely on Windows packages and custom applications.
- Uncertainty about Microsoft's plans for its Windows-based Terminal Server product.
- None of the seven sites calculated end-user costs as part of the MIS budget, so the dramatic potential savings of thin clients are not readily apparent.
- The "PC bureaucracy" — procurement, training, support and development — is so large at some companies that changing it to embrace thin clients is a problem.

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Gigabit Ethernet interoperability put to the test

Twelve companies demonstrate that products can work together.

By Robin Schreier Hohman
Durham, N.H.

The industry group responsible for testing interoperability among Gigabit Ethernet products said its latest round of testing shows the development of Gigabit Ethernet is right on track.

"The results are very positive," said Shirish Sathaye, vice president of engineering at Alteon Networks, Inc., one of the 18 members of the Gigabit Ethernet Consortium.

While the consortium did not release details, 16 products from 12 companies were tested, including gigabit-to-gigabit switches, aggregating switches, full-duplex repeaters, network interface cards and a network management product. The companies included in the testing were 3Com Corp., Acacia Networks, Inc., Alteon Networks, Inc., Bay Networks, Inc., Cabletron Systems, Inc., Cisco Systems, Inc., Extreme Networks, Inc., Foundry Networks, Inc., Hewlett-Packard Co., Prominet Corp. (which is being acquired by Lucent Technologies, Inc.), Sun Microsystems, Inc. and XLNT Designs, Inc.

While the consortium was congratulating itself on the unreleased interoperability results, others were skeptical.

"My only question is: Will they just pay lip service to it, or will they actually do something to make sure it happens?" said Lee Damon, an engineer at Qualcomm, Inc.'s testing lab in San Diego.

Qualcomm, whose main business is cellular phones, tests virtually all available network equipment in its lab to ensure that its phones will work across vendors' networks.

Vendors said they are committed. "Since interoperability was crucial, there was never any doubt in our mind that the products would interoperate," said Romulus Pereira, chief technology officer at YAGO Systems, Inc. "Start-ups have always been the ones driving the price performance curve, while some large companies use the fear of 'non-interoperability' as a distraction — a smoke screen to slow down adoption."

"The bottom line is that standards-based Gigabit Ethernet products will interoperate. Period," Pereira said.

Given the reluctance of IS managers to adopt yet another standard only to find out that interoperability eludes them, it had better. ■

JUST WHAT EVERY COMPANY N
A WORKAHOLIC WITH A BAD C
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IRED WINDOWS

Eliminate grunt work, and plan!

As the new year approaches, many people take time out to reflect on the choices they've made throughout the year, weigh those choices in light of more recent information and then figure out how to do things differently next time around. In real life, this is called making New Year's resolutions. In corporate life, this is called building a business plan.

The operative word is plan. Too often, the understaffed, overworked IS and IT departments throughout our industry are stuck being reactive when they ought to be proactive.

Too often, you let yourself get bogged down in help desk issues while technology-challenged yet marketing-knowledgeable executives and department heads do the planning for you.

As more decisions are made outside of IT, more small, nagging interoperability problems are created. This leads to more daily troubleshooting and fire fighting, which means less time to be involved in planning.

Resolve, right now, to not only break this cycle, but to reverse it.

If you aren't already using it, investigate help desk software. If you can't afford it, devise a plan to track all help desk requests. Even if you use Windows NotePad, start tracking every request for help and its solution. In a surprisingly short period of time, you should be able to begin identifying common help requests. Write up documents that identify all aspects of the problem, as well as the steps to take to correct it. Then make these documents available to your users so they can begin to solve their own problems.

Dave Kearns

If possible, create something similar to Novell's Technical Information Database or Microsoft's Knowledgebase — databases of problems, solutions and helpful hints. Make it available on your intranet so users can get at it with a browser. If you're database-challenged, use Microsoft's FrontPage, Allaire's Cold Fusion or something similar to handle keyword indexing for you.

Another possibility is to use a rules-based e-mail package, such as Microsoft's Exchange, to create a help desk mailbox. Then create rules to scan incoming messages from users for keywords identifying the common problems. Have the rules automatically return your helpful information documents to the user. Messages that contain problems not caught by the rules can be forwarded to a staffer for further study.

Continue to track problems and solutions, updating and adding to your solutions database. Soon you'll find that a majority — even a large majority — of the troubleshooting and fire fighting has been automated, leaving you time to concentrate on planning.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

Tip of the week

Novell's NetWare 3.2 upgrade is a good deal if you're still not sure whether NetWare 4 or Windows NT should be your next operating system. For less than $350 per server, you get new utilities, all current patches, new clients and protocols, and Year 2000 readiness — all of which can help you put off the decision until you can evaluate NetWare 5 and NT 5.

Headline:

A bandwidth manager with voice over frame relay.

Toll Quality Voice

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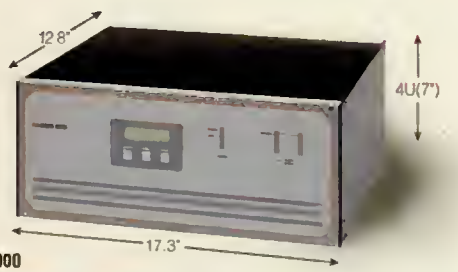

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Product description: Integrated bandwidth manager

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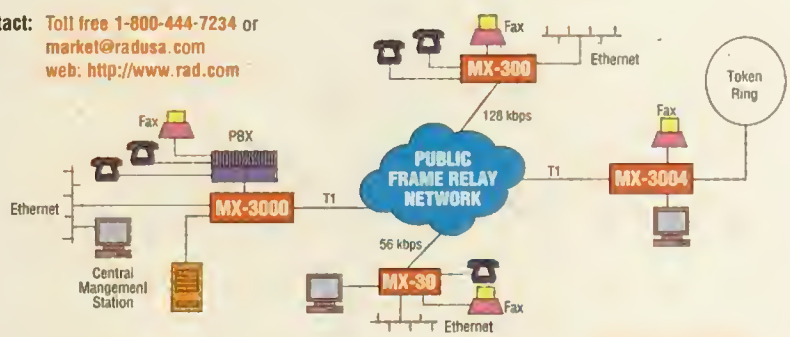

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Briefs

■ *Once touted as the* **"Cisco killer,"** *IBM's long-derided* **6611 router officially is dead.** *Effective March 31, IBM said the 6611 no longer will be offered for sale. In its place IBM recommends its new routers, the 2216 Nways Multiaccess Connector or the 2210 Nways Multiprotocol Router, depending on network needs.*
✆ IBM: (800) 426-3968

■ **Eicon Technology Corp.** *last week announced an* **external ISDN modem** *with Always On/Dynamic ISDN (AO/DI) support. AO/DI is a new ISDN technology that guarantees bandwidth will be available to handle the requirements of low-level data applications. Aimed at remote office users, Eicon's Diva T/A ISDN modem has a maximum throughput of up to 512K bit/sec with compression. It supports Windows 95, NT and 3.1, OS/2, and DOS systems. The new modem will be available in January and will start at $249.*
✆ Eicon: (514) 745-5500

■ **Cisco Systems Inc.** *last week introduced new versions of its* **CiscoWorks Blue** *network management tools for mixed SNA and IP networks. The new packages include Maps Release 1.2, which gives users an in-proved graphical view of their combined SNA and IP nets and adds Data Link Switching + Key Routers View, which lets users view the most important routers in their net. CiscoWorks Blue Maps is available now for $4,995.*
The company also enhanced CiscoWorks Blue SNA View with better security features and additional mainframe database problem tracing capabilities. SNA View offers an end-to-end snapshot of the SNA network from the CiscoWorks console. CiscoWorks Blue SNA View is available now and pricing starts at $9,995.
✆ Cisco: (408) 526-4000

Memotec aims frame relay at large LAN shops

New frame relay access cards offer improved connectivity options.

By Tim Greene
Montreal

Users looking for less expensive ways to link their LANs to a frame relay network can turn to new products from Memotec Communications, Inc.

The company last week introduced four new hardware cards that fit into its CX900/900e remote access switches. The six-slot chassis supports dial up and frame relay wide-area links.

The individual cards offer separate features, including the ability to connect more LAN devices directly into the chassis than previously possible. The cards also support 100M bit/sec Ethernet LANs and wide-area links up to 1.5M bit/sec.

The user view

The new Multi I/O cards support up to five synchronous or asynchronous LAN devices, eliminating the need for a separate hub to funnel traffic into the frame relay access device (FRAD), said Bob Smith, computer services manager for Rental Tools Equipment Corp., in Bladensburg, Md. Rental's 17-site network is tied together with CX900s. Until now, the CX900/900e only had a single-port I/O card.

More choices

With the new options, the CX900/900e are among the more flexible remote access devices that support dial-up and dedicated lines. They also support voice over frame relay.

One of Memotec's new cards, the Fast Ethernet 10/100Base-T with routing capabilities, lets users upgrade LANs from 10M bit/sec Ethernet without having to swap FRAD hardware.

A new T-1/fractional T-1 card expands the wide-area capability of the access switches from 56K bit/sec to 1.55M bit/sec. Smith said the card fits in with his company's plans to expand traffic to and from company headquarters.

The Memotec equipment eliminates the need for a separate wiring hub to funnel LAN traffic onto the frame relay network, said Bob Smith, computer services manager for Rental Tools Equipment Corp.

New software for the CX900/900e automatically will reroute frame relay traffic onto an ISDN link if the frame relay link fails.

The software then can filter out nonessential traffic to reduce WAN traffic when the ISDN link is in use.

The new cards for the CX900/900e range in price from $695 to $1,595.

✆ Memotec: (514) 738-4781

Resonate unveils flow management software

Dispatch series helps keep Web application servers running.

By Jim Duffy
Mountain View, Calif.

Resonate, Inc., a developer of traffic management software, has unveiled products that allow users to speed access to remote Internet, intranet and applications servers.

Resonate's new software includes two packages, Global Dispatch and Application Dispatch. Global Dispatch schedules server requests to the logically closest, least loaded Internet or intranet server.

As such, Global Dispatch links geographically distributed Internet sites and corporate intranets into a single, logical enterprise server. Global Dispatch directs traffic to servers based on the response time experienced by client workstations between each server point of presence (POP).

Application Dispatch offloads Web servers by prioritizing requests to application servers behind the Web site.

Application Dispatch also schedules requests to the least loaded, most available application server, which increases server response time and eliminates single points of failure, Resonate said.

For instance, if a user accesses the Web site of a stock exchange during high market activity, a trading site administrator can use Application Dispatch to schedule stock trading traffic ahead of stock quote requests, Resonate said.

Global Dispatch and Application Dispatch join Resonate's existing Central Dispatch product to form a three-tiered connection management architecture that Resonate calls IntelliFlow. IntelliFlow is designed to boost information flow throughout the enterprise by scheduling and prioritizing traffic at each level.

Resonate's IntelliFlow ring

- **Global Dispatch:** WAN scheduling and load balancing.
- **Central Dispatch:** Scheduling and availability of TCP services.
- **Application Dispatch:** Prioritization and load balancing of application servers.

Global Dispatch schedules WAN access to the least loaded POPs; Central Dispatch schedules Transmission Control Protocol requests within a POP; and Application Dispatch prioritizes requests to the optimal application server.

"I have a rack of Sun [Microsystems, Inc.] boxes that are serving a bunch of domains," said David Kearney, president of Boomerang Information Services, in Palo Alto, Calif., a provider of fax and e-mail broadcast services.

"There's always an issue of machines going down, machines being taken down for upgrading, and making our services available to people on the Web all of the time," he said.

"I bought the Resonate [Central Dispatch] software to keep the servers up so if I had to take one down out of the mix, the others would be able to respond and we wouldn't have any issue of people not being able to get to their services," Kearney said.

Resonate Global Dispatch costs $35,000, and Central Dispatch and Application Dispatch cost $10,000 and $5,000, respectively. All the products are available now.

✆ Resonate: (415) 967-6500

Get more online:
- An audio primer that explains basic frame relay concepts
- More detailed frame relay overviews
- A FRAD vendor list

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www.nwfusion.com

Briefs

■ ***An imposing* group of telecommunications providers** *has banded together to build a 20,000 km trans-Pacific fiber-optic link between the United States and China. Scheduled to be in service by 2000, the* **China-U.S. Cable Network** *system has enough capacity to carry up to four million simultaneous phone calls.*

Carriers buying into the project include AT&T, China Telecom, Chunghwa Telecom, Hong Kong Telecom, Kokusai Denshin Denwa (Japan), Korea Telecom, MCI Communications Corp., NTT Worldwide Network Corp. (Japan), SBC Communications, Inc., Singapore Telecom, Sprint Corp., Teleglobe USA, Telekom Malaysia and Telstra Corp. (Australia).

■ **MCI Communications Corp.** *has taken steps to make monitoring its* **Internet network** *easier for users. The MCI Internet Traffic Report Web site*

includes traffic delay and packet delivery statistics for the entire network and statistics on latency between specific cities. MCI also announced a network availability guarantee for all of its Internet services.

If users cannot access MCI's network for more than 10 minutes, they will receive a full-day credit. A three-hour outage will equate to a three-day credit on their invoice.

While analysts agree this is a step in the right direction, MCI does not offer a minimum latency guarantee on its network and will not do so before mid-1998, said John Scarborough, internetMCI's director of business markets product marketing.

Frontier uses low prices to infiltrate frame relay market

Expanding carrier offers no-frills service based on national network; managed router offering on tap.

By David Rohde
Rochester, N.Y.

The nation's fifth-largest long-distance carrier has entered the crowded national frame relay market with a new coast-to-coast service.

Frontier Corp.'s formula for its frame relay service is low prices, no frills and transport over an emerging coast-to-coast Synchronous Optical Network (SONET) network that will protect against outages.

Frontier is not brand-new to frame relay. The carrier has been offering a service for several years in New York state as part of an effort to expand beyond its roots as Rochester Telephone Co., the dominant local exchange carrier here.

To expand the service nationally, Frontier recently installed 16 Cascade B-STDX 9000 switches from Ascend Communications, Inc. in an arc fanning out from Rochester across the Northeast and Midwest. To complete the coverage, Frontier installed seven additional Cascade switches in Los Angeles, San Francisco, Seattle, Denver, Dallas, Atlanta and Tampa, Fla.

Frame relay everywhere

Frontier officials said they can offer frame relay access at 232 long-distance points of presence, with traffic backhauled to the Cascade switches if necessary. But they conceded that they still must lease fiber from other long-distance carriers to carry much of that traffic. To eliminate the hurdle, Frontier is building a national self-healing SONET network due for completion late next year.

Frontier's two-way permanent virtual circuits are priced comparably to AT&T's, starting with a barebones PVC offering 3K bit/sec of guaranteed throughput with bursts up to 56K bit/sec for $18 per month. That is equal to AT&T's monthly price for an entry-level PVC. But charges for the ports on Frontier's frame relay switches run as low as half that of AT&T (see graphic).

Frontier's service is designed strictly for IP and IPX applications, with carrier officials right now discouraging use of the network for SNA and voice traffic. Frontier also does not offer priority PVC classes that favor delay-sensitive applications over other traffic.

Users like it

That is OK with John Rueckel, chief information officer at Griffith Oil Co., a Rochester-based gasoline and heating fuels distributor. In 1995, Griffith Oil dumped its 9.6K bit/sec analog private-line network for a Frontier frame relay net connecting 16 distribution sites with Griffith headquarters.

The 56K bit/sec frame relay connections enable branch distribution managers to access and update the company's customer data, all housed at headquarters, over the inexpensive PVCs. A separate long-distance voice contract with Frontier gives the company a complete package at favorable rates, Rueckel said. Frontier also provides remote management of Griffith's 3Com Corp. NetBuilder routers. Although a managed router service is not yet available nationwide, Frontier officials said they expect to formally introduce one in February.

✆ Frontier: (800) 249-4672

THE BIG SAVINGS ARE IN PORTS

Frontier's monthly frame relay port prices are much less expensive than those of other national carriers, particularly AT&T:

Port speed	Frontier price	AT&T price	Percentage savings with Frontier
56K/64K bit/sec	$151	$285	47.0%
384K bit/sec	$513	$1,145	55.2%
T-1	$1,621	$2,535	36.1%

Frontier prices require a one-year term commitment. Listed AT&T prices do not include standard or negotiated volume discounts.

US WEST targets large SNA nets

By Tim Greene
Denver

US WEST, Inc. recently introduced a suite of frame relay services designed to handle temperamental SNA traffic and guarantee performance.

The service offerings from US WEST's !nterprise division include managing the frame relay service and access device at the customer's site.

The services also enable a user to tie SNA traffic into a frame relay network without installing new hardware.

The new services come with guaranteed network delays of less than 70 msec in one direction.

With the new offerings, customers can establish service-level agreements that guarantee latency, frame discard rates, network availability and mean time to repair problems.

The guarantees will help ease the minds of SNA network managers who are apprehensive about using frame relay, according to Tom Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J.

The !nterprise managed frame relay service includes the FRAD, a frame relay line with priority-based SNA permanent virtual circuits (PVC) and network monitoring, fault detection and repair.

!nterprise also offers Central Office FRAD service for customers who want to send SNA traffic over a public frame relay network without installing new hardware.

SNA traditionally has been carried over dedicated point-to-point wide-area links.

The attraction of frame relay is that it reduces customer bills by eliminating more costly leased lines.

The new services, available nationally, put US WEST's !nterprise division into direct competition with MCI Communications Corp., Sprint Corp., AT&T and regional frame relay carriers.

Sprint guarantees a maximum delay across its network of less than 115 msec for a 56K bit/sec circuit and 55 msec for a T-1.

MCI's frame relay for SNA service gives users the option of assigning high, medium or low priority to their PVCs.

While SNA can be given priority, there are no performance guarantees.

✆ !nterprise: (800) 328-2879

US WEST FRAME RELAY LIKES SNA

Sample monthly rates for US WEST frame relay lines fine-tuned for SNA*:

DS-0 access	$47.00
DS-0 port (1 PVC)	$39.28
Total	**$86.28**
DS-1 access	$126.50
DS-1 port (1 PVC)	$240.00
Total	**$366.50**

*Discounts of up to 10% apply for long-term contracts.

Get more online:

- **A white paper on Implementing a frame relay network**
- **Tips for getting the most out of your frame relay service and carrier**
- **A look at frame relay switched virtual circuits**

5215 FUSION

www.nwfusion.com

WAN MONITOR

The remote office Christmas wish list

With the increasingly distributed nature of corporate operations, the remote Small Office/Home Office (SOHO) worker needs some attention.

We spend a lot of time working off-hours in our homes, and we are continually frustrated. So in the spirit of the holidays, here's our wish list for that environment — vendors and service providers take note:

● A decent SOHO phone. We cannot tell you how many phones we've gone through in the SOHO environment trying to find one that truly supports the SOHO user. You'd think the people designing phones never left their cubicles, because the phones really are not ready for prime time. Conference bridging across phones still tends to stink.

Daniel Briere and Christine Heckart

The programming interfaces are primitive; trying to spell names with numeric keypads is like starting a fire with flint. And what we wouldn't give for a phone that really knew that many SOHO-ers use accounting codes — secondary codes that help you allocate expenses.

Most phone makers have clued in and allow you to insert a pause into a numeric string (cryptically hidden in the hold button on most phones) so you can add secondary digits. But few will allow you to enter a 1, a 10-digit phone number, a pause and all the extra digits you want (within reason).

Of the phones that do, the length of that second-digit string is often limited (ours support 12). And if there is a third stage, like in voice mail, forget it.

While we're at it, how about creating a phone that offers one button to check voice mail. Sure you can program a button, but America wants a simple phone. How about a green button to check voice mail, and a blue button for line 1 and so on?

Give us a blinking light on our phones that indicates we have voice mail, just like the main office, not some add-on device that is not integrated into the phone.

● A phone company that realizes how many %^#@%$ phone lines it takes to work at home. We get grief from the local telco when we try to add lines at home.

But look at what it takes to have a home office: one line for fax, one for Internet access (dialed-up full time) and at least two lines for phone calls. Throw in a home phone line and you've got five phone lines (assuming you don't need teen or nanny lines).

Sure, you could trim this down by sharing the fax and Internet lines or by making do with call-waiting or central office-based conferencing. But as a telco, the incentive should be to get us to order more phones lines, not have us get by with less!

● For Santa's sake, let's have some standardization on that voice mail delete button. In some locations, "7" is the delete button, in others it's the play button.

Come on vendors. There's no market differentiation here — standardize for the holidays.

Briere is president and Heckart is vice president with TeleChoice, Inc., a consultancy in Vienna, N.J. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.

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Multimedia • Electronic Commerce • Security

Briefs

■ **Rainbow Technologies, Inc.'s** *Internet Group has begun shipping CryptoSwift/EN, a hardware-based Secure Sockets Layer (SSL)* **cryptographic accelerator** *for a variety of Unix plat-*

forms, including Sun Microsystems, Inc.'s Solaris and Hewlett-Packard Co.'s HP-UX.

Crypto-Swift/EN, which costs about $2,000, speeds up processing of Web-based, SSL-based transactions by 50%, the company claims.

✆ *Rainbow: (714) 450-7460*

■ **United Parcel Service, Inc. (UPS)** *last week said it has made an equity investment in* **Trade'ox Electronic Commerce Systems, Inc.,** *which makes online order and procurement software for the Internet.*

Through the investment, made via the UPS Venture Capital Fund, UPS gains a seat on the Trade'ez board of directors and can influence future product direction at Trade'ez.

■ **IBM** *is set to challenge some perennial market leaders in the database arena by bringing high-end* **DB2 Universal Database** *features to multiple platforms and beefing up third-party support for the product, company officials said.*

In the first quarter of next year, IBM plans to release a massively parallel processing (MPP) version of the database, called DB2 Universal Database Enterprise-Extended Edition, for clusters of Windows NT and Solaris servers, according to company officials. This will be the first time IBM offers MPP database capabilities on platforms other than its own.

Just what did Netscape get for $180 million?

Kiva acquisition boosts Netscape enterprise product line, according to Kiva founder and CEO Keng Lim.

Q&A

Kiva Software Corp. can look back fondly at its nearly three-year history as an independent company. The Web server software company has received kudos from industry analysts, awards from publications and business from innovative Internet commerce firms such as Internet Shopping Network, Inc. But Kiva is independent no more, having been acquired effective Dec. 2 by Netscape Communications Corp. for $180 million in stock. *Network World* Senior Editor Andy Eddy discussed the whirlwind acquisition with Kiva founder and CEO Keng Lim.

Beyond the obvious financial benefits, what was Kiva's incentive to accept Netscape's offer?

Companies like Oracle [Corp.] and Microsoft [Corp.] have introduced similar products, but they aren't as robust as ours. We see it as critical to have a strong partner like Netscape to help promote Kiva Enterprise Server as an industry standard. Having access to Netscape's sales force, systems integrator channels, partners and professional services will allow us to scale a lot faster. We have close to 50 customers, and with the support from Netscape we can increase the customer base by 10 or 20 times in the next couple of months.

What does Netscape get out of the Kiva acquisition?

It positions Netscape to be an enterprise software company. Netscape has been viewed as an Internet company with great products and technology for messaging, collaboration, Web servers and Web browsers. Having Kiva immediately broadens its product offerings to now address business-critical applications.

What is the effect of the acquisition on Kiva's existing customers?

Most of them are already Netscape and Kiva customers. With this combination, we will be able to bring more positive impact to the customers, such as providing a higher level of customer support.

There is potential confusion with both Netscape and Kiva offering products called Enterprise Server. What are the differences, and how will the products be differentiated in the future?

We're working on a new product strategy and a new product, and we're in the process of renaming the products. We will make an announcement sometime this year or early next year about how these two products will be differentiated.

Kiva Enterprise Server is targeted for business-critical, enterprise-class applications for a company that wants to automate business processes and build a big [electronic] commerce application. Netscape Enterprise

Server provides a solution for enterprise-strength content management, and also collaborative and work force applications. Eventually, we'll integrate Kiva technology into SuiteSpot [which includes Netscape Enterprise Server], but Kiva Enterprise Server will be offered as a separate product line.

What about Kiva's other products?

We are still on target to ship all the other products. One is Kiva Development Studio. We'll be aggressive, taking some of Netscape's technologies and adding them to Development Studio to make it the foundation for the development tools and solutions for the Netscape ONE platform.

Where do you personally go from here?

I'll be heading up a new [Netscape] business unit called the Applications Server Platform Division as general manager and vice president. I will continue to define the strategy and product-development efforts of Kiva technologies under Netscape. I'm working to carve out the new directions for Netscape to go in the enterprise market. ■

Get more online:

- **An expanded version of this interview**
- **An overview of Web application servers**

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E-commerce market set to soar

Survey says business-to-business transactions will rule.

By Ellen Messmer
Framingham, Mass.

Electronic commerce on the Internet is poised to grow from today's $10.6 billion market to a breathtaking $223 billion market by 2001, according to new research.

Although an estimated 45% of U.S. households will be online by the end of the decade, up from 18% today, electronic commerce on the 'Net will be dominated by business-to-business buying and selling rather than retail-to-consumer transactions.

These are among the findings from International Data Corp. (IDC), a market research firm here, which recently organized a division called Internet® IDC to spearhead this type of forecasting.

IDC also has surveyed customers about which vendors they are choosing to supply Internet and related products.

In one survey, IDC asked 100 Webmasters to name their primary software provider for three uses: Internet, extranet and intranet.

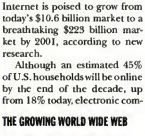
Netscape Communications Corp. accounted for 27% of the Internet market, 32% of the extranet market and 30% of the intranet market. Microsoft Corp. held 26%, 32% and 36% shares, respectively, in these three categories.

IBM registered 2%, 4% and 3% market shares, while Oracle Corp. inched onto the survey's charts at 1%, 4% and 2% shares. Among the smaller companies, O'Reilly & Associates, Inc. had a respectable showing with 2% shares in the Internet and intranet categories.

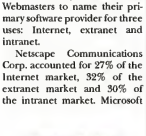
✆ IDC: (508) 872-8200

THE GROWING WORLD WIDE WEB

Total users by region in 1996: 27.8 million



Projected total users by region in 2001: 175 million



SOURCE: IDC, FRAMINGHAM, MASS.

'NET INSIDER

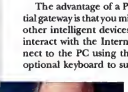
Sometimes dumber is better

Residential gateways seem like a great business opportunity, but if done wrong, they can cause great harm to the future of the Internet.

A residential gateway is one of the current jargon phrases for what has been called a set-top box in the cable TV world.

There are two basic concepts for this network gateway for the home: It could be a PC-like device for accessing network resources such as pay-per-view programs and stock quotes. Otherwise, it could be a router connecting multiple in-home networks to multiple networks to the home.

The advantage of a PC as the residential gateway is that you might not need any other intelligent devices in the home to interact with the Internet. You can connect to the PC using the TV set and an optional keyboard to surf the 'Net or to order a viewing of "Rocky 27: Shuffleboard to the Death."



Scott Bradner

The disadvantage is that you may have to connect to the PC to do anything, and then you can only do the things that the PC is programmed for, or which can be downloaded to it. This type of residential gateway inhibits innovation.

A residential gateway that is a router fosters innovation. One of the most important reasons the Internet is such a powerful force in shaping the technology present and future is because it does not get in the way.

In the telephone network, the phone switches define the services offered to network access devices (telephones). In contrast, the Internet's network switches and routers merely forward IP traffic. This means that in the Internet, any IP-based application can be run between consenting hosts without having to change anything in the network itself.

Today's telephone network is known, a bit self-promotingly, as the Intelligent Network or IN (see Faynberg et al.'s *The Intelligent Network Standards*, ISBN 0-07-021422-0 for more information). Network intelligence seems to be a good thing for the phone business, but implemented the way that it has been, it prevents customers from experimenting with new applications on their own.

In the Internet, there is a freedom to experiment. The best example of the usefulness of this freedom is the World Wide Web, which was developed from a grass-roots effort, not from some standards-based top-down one.

As pundit George Gilder points out, the Internet is proud to be a dumb network. Its intelligence is in the devices at its edges, and the intelligence of these devices is growing every day. Soon there will be more computing power in the average TV set than in the PCs of a few years ago.

The vendors of PC-based residential gateways seem to think it's time for the Internet to get smarter. I don't think that is a good idea.

The smart home PC and smart TV set should have access to a network that does not get in the way of innovation and progress. Inhibiting the ability to experiment is a sure way to limit the future.

Disclaimer: "Harvard" and "dumb" in the same paragraph does not parse, so the above must be my wanderings.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

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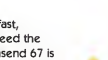

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*Actual test results sending Netscape 4.1 program file (12.734mb)

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Are you a hypocrite?

Gloating about Microsoft's recent setback at the hands of the Justice Department?

If you are, but you continue to buy Microsoft products, then you're a hypocrite. You are shifting the responsibility for curbing Microsoft's alleged abuses to someone else — the government, in this case — and abdicating control over your network environment.

Many IT professionals loudly lambaste Microsoft, yet persist in sending their money up to Redmond, Wash. In doing so, they are falling prey to the new American tradition of shifting blame to someone else. They're like smokers who decry the tobacco industry as the cause of their health problems. They want regulators, legislators, judges, attorneys — someone, anyone — to protect them from their own choices.

Neither the feds nor the states can control Microsoft, as anyone who followed the IBM antitrust proceedings years ago can attest. Sure, the government can institute investigations and hearings and suits ad nauseam, but Microsoft has deep pockets and will delay concrete action for years.

As with IBM, the only thing that can change Microsoft is the free market. That means you. You vote with your dollars. Big companies get big because you buy from them. Big companies push the boundaries of power and only you, customers, can rein them in.

If you don't like Microsoft's bundling practices, if you don't like its sales tactics, if you think Bill Gates has too much say over the direction of network computing, then buy from his competitors.

Use Netscape or Apache Web server software (Apache is free, for gosh sake). Use Netscape's browser. Buy Unix for your server applications. Get your database from Oracle or IBM. Use Lotus' groupware, Qualcomm's Eudora mail, Novell's directory services and development tools from any of the companies that offer them. Get Macintoshes if you're concerned about Windows. Insist on 100% Java compatibility. There is no shortage of technology options.

Don't applaud the lawyers who represent Microsoft's competitors. They are not looking out for your best interests. They are looking out for the narrow self-interest of clients who pay them lots of money. Those lawyers are getting money that could have gone into research and development or better customer support. Back Netscape's products, not its court filings.

If you think Microsoft offers robust products and good value, buy without guilt. But if you think Bill runs an evil empire, take a stand. Open your wallet and support his opponents by buying their products.

But don't straddle the fence. Don't send your cash to Microsoft while cheering the feds. Don't be a hypocrite.

John Gallant, editor in chief — jgallant@nww.com

Network Strategies • John Bailey

End-to-end offerings will take you only so far

Some industry CEOs have been talking a lot lately about providing end-to-end network solutions. This strategy used to be called one-stop shopping; it's based on the belief that network managers prefer to buy everything from a single large manufacturer. As in most marketing strategies, there's some truth here and a lot of hype.

Sometimes it makes sense to get everything from a single supplier. If you've got a small staff for network planning and equipment evaluations and will need a lot of ongoing support, it's good to have as few suppliers as possible.

But rather than going with an end-to-end vendor, you'd be better off considering a network integrator. Integrators can design, install and maintain a network with the same expertise as the equipment manufacturers, and they're not locked into a particular product set.

At one time, end-to-end networks from vendors such as IBM and Digital were common. But when the world shifted to PCs and LANs, users learned that no single vendor really could supply all the components; they had to combine products from several suppliers. Vendors were forced to compete for each major element of the network. Users paid less and had more choices.

Central to this process was an increased emphasis on standards. TCP/IP replaced SNA, SNMP replaced proprietary management protocols and so on. Everything had to adhere to standards.

This leads us to the technical center of the end-to-end debate: To what extent can a single manufacturer deliver synergy that you can't get from multiple manufacturers supporting standards? The answer depends on the degree of technical overlap among products.

For example, consider an ATM campus network. You can get wiring closet switches and backbone ATM switches from different vendors, and they'll work together. But most users demand a single manufacturer, even when they buy through a network integrator. Why? Because doing so makes it easier to configure emulated LANs, integrate queuing and buffering with quality-of-service options, and manage it all using a single network management application.

Now consider the same campus ATM network, but think about connecting it to a WAN. It's critical that the campus network have a standards-based boundary. Otherwise, customers will have to choose carriers based on the equipment they use rather than more important issues such as cost, services offered or support. The bottom line is that users would rather get the best product in each category — regardless of the vendor.

One last point. Large vendor companies have been buying start-ups at an amazing pace over the past four years, and that's likely to continue. As a result, vendors offer products that were conceived and engineered at different companies, and consequently have different architectural approaches, features and management software. When these get stuffed into the same box, it's basically power supply integration. There's not much synergy in 5 volts.

So let's face it: End-to-end solutions make sense for support, but you can get that best from a network integrator. They also make sense for technical reasons, but only in highly synergistic applications. So why do vendors want to sell total end-to-end strategies to the investment community?

Basically, it's an addiction to growth. When a market segment — such as hubs or software-based routers — flattens out, vendors have a problem. They need to keep growing to sustain the stock price growth that attracts top engineers and salespeople. So they move into new areas of business. Sometimes that's a synergistic step, like routing and hub companies moving into LAN switches, and sometimes it's a lot further afield.

Either way, vendors would like investors to think that every user wants to get every product from a single manufacturer. You know better.

Bailey is vice president of engineering for Xylan Corp. in Calabasas, Calif. He can be reached at john.bailey@xylan.com.

MESSAGE QUEUE

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.

Quote clarified

Your article "Fixing the FCC" (Nov. 24, page 1) quotes me as characterizing the FCC as "an arrogant bunch of bureaucrats." If that's what I said — and it does appear in your reporter's proffered summary of our phone conversation, which I approved — I want to express my regret for having contributed in this way to the flow of ugly rhetoric that all too often passes for serious public discourse.

What I intended to say is better conveyed by my preceding statement that "The FCC has precipitated a lot of these appeals to the courts by presuming a competence — both legal and intellectual — that they don't have."

Why Windows is dissolving into open standards

We will remember 1997 as the year when Microsoft tightened its hegemony over distributed computing and many industry players tried everything they could think of to subvert this new order. Some sought relief through political and regulatory channels, others through standardization and promoting thin-client computing and still others through nonstop Microsoft-bashing.

The truth is Microsoft has never been so strong yet so vulnerable in the desktop and server markets. On the one hand, Microsoft has become the mothership of modern distributed computing, covering most important enterprise software bases, including browsers, desktop operating environments and application suites. On the other hand, it has systematically de-emphasized the proprietary core of its systems architecture in favor of open industry standards.

Increasingly, Microsoft's architecture is coming to resemble that of the most fervent standards zealot — Netscape — fielding products that, thanks to open standards, have their entire function sets exposed and available to any third-party software developer. Even Microsoft-developed specifications such as ActiveX and Messaging API are being turned over to industry consortia as open development frameworks rather than being kept close to the vest as competitive weapons.

A noteworthy example of Microsoft following rather than leading the standards community involves HTML and Extensible Markup Language (XML). Microsoft standardized on HTML — the Web's universal interface — as the presentation and hyperlinking file format for future versions of Windows and Office. It also has standardized on XML as the native file tagging and storage format for its applications.

The company has pledged to continue supporting proprietary file formats such as Word and Excel, but clearly it will devote its resources to building evermore sophisticated Dynamic HTML (DHTML) features and XML document-type definitions to support its products. The document tagging/formatting standards are controlled by the World Wide Web Consortium, not Redmond, and will drive vendor-proprietary formats to extinction.

Microsoft also has implemented Internet-standard IP addressing, Domain Name System address-resolution, X.500 hierarchical naming and URL path name specifications as fundamental features of the upcoming Windows NT Server 5.0. The naming/addressing standards are overseen by the Internet Engineering Task Force, not Microsoft, and are not likely to bend to the narrow interests of any one software vendor. One can foresee the day when Microsoft might replace Windows NT Server's Distributed File System with the world's de facto distributed filestore: the Web, with the URL as the universal path name format.

In these and other areas, we will see a blurring of the boundaries between Microsoft's environment and that of the world at large. Windows applications will become polyglot presentation containers for a growing range of pages, components, streams and scripts originated in other environments and delivered transparently over the Web. Full integration with the Internet/Web namespace, filestores and directories will make Microsoft environments completely visible and searchable from anywhere. Integration with industry-standard security technologies will pave the way for cross-platform electronic commerce and heterogeneous extranets.

It's absurd to expect that Java — merely a programming language and content-rendering virtual machine — could replace the Windows distributed operating system infrastructure in its entirety. How can Java alone hope to match the diverse features built into Windows 9x and NT? Most levelheaded IT professionals know that Java-based network computers will not replace Windows on corporate desktops. By the same token, ActiveX will not stray far from its Windows origins to do serious battle with Java in cross-platform computing.

There will be no white knight to seriously challenge Windows in the mainstream operating system wars. It has cleared the field of all but the dinky (pocket computer operating systems), the dinosaurs (Unix, MVS), the dying (Apple) and the dead (OS/2). However, Bill Gates may go down in history as the Mikhail Gorbachev of distributed computing, presiding over an empire dissolving into a field of standards established elsewhere.

This trend can be seen most clearly in the way Microsoft has de-emphasized, under the Distributed interNet Applications framework, the core Windows presentation technologies — Win32 APIs — in favor of the new world order of DHTML, mixed components and mixed scripting languages. Given the amazing effects achievable with this new palette of presentation tools, old-line Win32 application graphical user interfaces (GUI) look increasingly dated. And attempts to use Windows Terminal technology to extend Win32 into this new network-centric environment will look increasingly pathetic.

Microsoft of course will survive and prosper in this new order. It can hardly fail when it has almost every niche covered with best-of-breed product offerings. But it will not be able to count on its treasured Windows franchise to secure its fortunes for long. It will have to retool to support a revolutionized client environment that uses Windows to host a profusion of creative, new GUIs written in Java, ActiveX, DHTML and the as-yet-unborn languages of the new millennium.

Kobielus, a contributing editor to Network World, *is a senior telecommunications analyst with LCC International, Inc., a McLean, Va.-based network design, engineering and integration firm. He also is coauthor of an upcoming Rapport Communication report on Microsoft's intranet and groupware products and directions.*

When the commission adopted hypothetical costs of optimally designed plants as the basis for its prescribed charges for unbundled network elements, I criticized this move as being "presumptuous" and reflecting "regulatory arrogance." However, I did not intend to attach those labels to the regulators themselves. I have every confidence that the staff and members of the FCC were trying conscientiously to fulfill their responsibilities under the telecommunications act.
Alfred Kahn
Ithaca, N.Y.

Thanks for the insight

I enjoyed your excellent article on the Federal Communications Commission and its handling of the Telecommunications Act of 1996 (Nov. 17, page 59). I am not a lawyer, but I do direct a nonprofit videoconference community network, Project DIANE, that inexplicably gets bumped around sometimes by our local telco. We're still waiting to reap the telecom act's promised benefits.

Your article has helped to clarify the big picture and has given me some insight as to why phone companies sometimes act the way they do.
Steve Shao
Director
Project DIANE
Nashville

Good deal

Thanks for your editorial about high-bandwidth services for consumers, telecommuters and small businesses ("Where have you gone Gordon Moore?" Dec. 1, page 50).

The lack of consensus about digital subscriber line (DSL) probably will continue given the technological advances that we are seeing. It's too bad a firmware-upgrade approach could not be used to migrate to each new, better flavor of DSL.

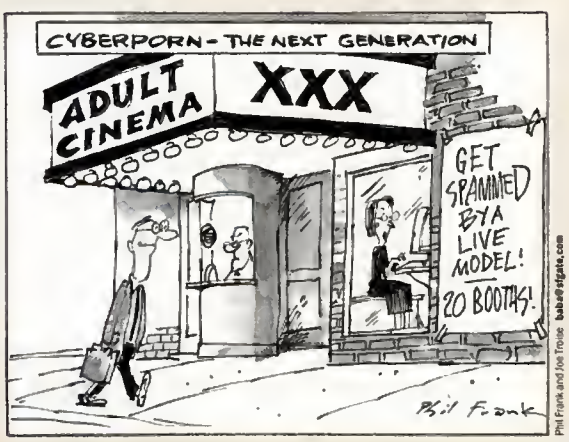
I finally bought into ISDN this past spring and have thoroughly enjoyed it. Here in Houston, I pay $141 per month for unlimited 128K bit/sec ISDN access to the Internet, two business phone numbers and Caller ID, with no per-minute charges.

Folks in other parts of the U.S. have told me that I have a good deal here. So your exclaiming "Ouch" at paying $50 to $100 per month or more for 500K bit/sec to 1.5M bit/sec caught my eye.

I would love to see that kind of price range, but I don't expect it to be widely available until the (regional Bell operating companies) open their markets to competitors. I'm not holding my breath.
Kirk Mahoney
President
Engaging Media
Houston

GO ONLINE to read more letters to the editor.

Teletoons



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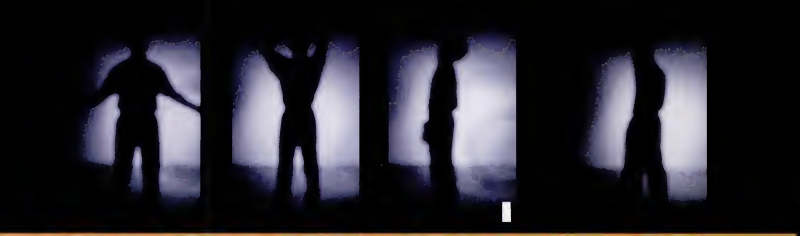

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FEATURE

ATM SWITCHES NOW OFFER TRAFFIC MANAGEMENT, BUFFERING, LEGACY LAN SUPPORT AND MORE. HERE'S YOUR GUIDE TO SORTING THROUGH THE OPTIONS.

A feast of functionality

By Kevin Tolly and Andrew Hacker, The Tolly Group

Now that ATM has been around for more than half a decade, it's finally taking shape. The ATM Forum, with help from the International Telecommunication Union (ITU), has ratified all the standards necessary to let you build scalable ATM nets that support legacy LAN traffic. In total, the forum and ITU have completed nearly 100 ATM standards and have another 30 in the works.

You now need to determine what standards and features each vendor supports and how they fit into a functional ATM network. To that end, The Tolly Group over the past several months has identified and tested more than 50 key functions and specifications that represent a broad spectrum of ATM functionality.

Switches from 3Com Corp., Cisco Systems, Inc., Digital Equipment Corp., FORE Systems, Inc., Hitachi Computer Products, Inc., IBM, Madge Networks, Inc., Olicom, Inc. and Xylan Corp. were subjected to days of functional verification as well as performance benchmark tests. Detailed results of all tests are found on The Tolly Group's Web site. The study is ongoing, and new results are added frequently.

The purpose of this article is not to simply detail who beat whom and by how much — you can go to the Web site for that info — but rather to pass along some of the more important lessons learned from our ATM tests. Even though ATM is, by its nature, multipurpose and able to span LANs and WANs while supporting voice, data and video, there are certain aspects you'll need to master no matter what your intended use. These aspects include signaling, traffic management mechanisms, buffering schemes, legacy LAN support, and bridging and routing features — the items we will explore here.

The cell foundation

The most important strength of ATM lies in its ability to operate entirely at its lowest layer, the cell. Every higher layer function, from Layer 3 routing to LAN integration, can be subcontracted to a stream of cells that run at the speed of the switch fabric, wire speed in all cases.

This distinction is most obvious when you look at routing mechanisms. In traditional networks, a router must route each individual packet. In an ATM net, software with routing intelligence, which can reside on a switch or an external routing device, is used to establish a route from point A to point B. Thereafter all data is packaged in cells and transferred directly to the destination at wire speed.

To find a switch that delivers the best performance, you need to pay attention to the switch fabric and types of interfaces. Switch architecture is really not important. What matters is that the fabric is nonblocking — that all cells can be switched from all ports at line rate without cell loss.

Prior to this year, many vendors that claimed to have fully nonblocking architectures, in fact, did not, as uncovered by previous ATM tests conducted by The Tolly Group. However, all of the switches in this current study have fully nonblocking fabrics.

ATM services

Signaling, the process of setting up a circuit, is the most fundamental process on an ATM switch. The simplest form of signaling is User-to-Network Interface (UNI), which allows an endstation to communicate with a switch.

In addition to UNI, scalable multiswitch ATM networks require support for a Network-to-Network Interface (NNI). ATM's dynamic routing "protocol" is Private NNI (P-NNI) Version 1.0. P-NNI is based on a structure of hierarchical peers and is analogous to current IP routing protocols such as Open Shortest Path First. P-NNI allows switches to route switched virtual circuits (SVC), perform best path calculations and reroute around failed links.

Don't even consider buying a switch that doesn't support UNI (Version 3.0, 3.1 or the latest, 4.0) and P-NNI signaling. All the switches we tested had some form of each.

Regardless of what version of UNI you use, as long as you've got switches that utilize P-NNI 1.0 (or even a prestandard version of P-NNI when using switches from a single vendor), implementing signaling is generally as simple as connecting switches to endstations and other switches. Avoid having switches and endstations with dissimilar versions of UNI and P-NNI, because you won't be able to establish a connection.

Some of the more sophisticated functions of signaling, such as quality of service and multilevel P-NNI routing, may require more configuration, but many vendors will supply support engineers when implementing larger networks.

This kind of complexity exists in any large router-based network, but contrary to popular belief, ATM isn't inherently more complex in this regard. In fact, in some respects, it's simpler. For example, the 40-byte ATM address includes

About the 1998 ATM Switching Industry Study

In an effort to show product differences and provide you with the comprehensive data required to make purchasing decisions, The Tolly Group has applied its Industry Study model to ATM switches.

The Tolly Group evaluated key switch aspects: performance; ATM and LAN interface support; traffic management, including buffering issues and advanced features; signaling and ATM routing; legacy LAN service (LAN Emulation, Classical IP) support; and several management features, including redundancy.

Invitations to participate in the testing were sent to all ATM switch vendors. The participating vendors funded this project.

The complete set of test results is available free worldwide and will be updated during 1998 as additional products are evaluated.

You can access this information via Network World Fusion.

Network World Fusion

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www.nwfusion.com

the equivalent of a media access control (MAC) and an IP address. At a cursory glance, the large address space may be intimidating, but once you get into it, you'll see it makes sense.

Nonetheless, vendors are looking to provide ease-of-use features. For example, 3Com, Digital, FORE, Madge and Olicom are starting to deliver features such as autodetect and UNI 3.X conversion. Autodetect allows the switch to determine what version of UNI an endstation is running. UNI 3.X conversion allows the switch to connect UNI 3.1 stations to UNI 3.0 stations.

UNI and P-NNI are used to set up SVCs between two or more stations and notify each station which virtual circuit to use. Stations then transmit cells at line speed over that virtual circuit. The bulk of signaling activity occurs at SVC setup and release, with only negligible polling in between to ensure an SVC is still active.

That means the most important signaling performance metric is the number of calls a switch can set up and tear down per second. The Tolly Group found the switches fall into three basic categories: less than 30, from 88 to 126, and more than 300 (FORE). Generally, more is better, especially in large, complex networks.

Advanced traffic management

ATM was designed to accommodate all types of traffic using four basic classes of service: constant bit rate (CBR) for traffic with predictable uncompressed voice, variable bit rate (VBR) for unpredictable traffic such as compressed video, available bit rate (ABR) for bursty LAN traffic, and unspecified bit rate (UBR) for all other traffic. An ATM switch allocates its resources by enforcing these class-of-service policies or "contracts." If traffic streams violate predefined policies or contracts, cells will either be discarded immediately or marked for eventual discard.

If you're designing a campus ATM net, don't be overly concerned about CBR and VBR, unless you need to support time-sensitive traffic. When designing wide-area nets, where bandwidth is more precious and a wide range of traffic types are the norm, CBR and VBR are extremely important.

Relatively few switches tested — those from Cisco, FORE and Hitachi — support VBR. However, more than half the vendors did support CBR, including FORE, Digital, Hitachi and Xylan. CBR is less complicated than VBR because it deals only with managing peak cell rates. By comparison, VBR enforces peak cell rates, average cell rates and cell delay, and even limits excessive cell bursts.

In our tests, CBR and VBR functioned flawlessly on the switches that offered these classes. The switches discarded any cells that were above the threshold defined by our engineers.

Given that ABR was only recently ratified and isn't widely supported, it wasn't tested for this study, although it will be included in future efforts. Neither was UBR. UBR is essentially a class that traffic fits into if it doesn't belong in some other class and offers no guarantees that those cells will be switched. Therefore, UBR streams are not policed; if a switch needs to discard cells from a UBR stream, it simply does so, leaving little to be learned from testing. Some vendors may eventually provide special schemes to help preserve UBR traffic streams.

Buffering

Buffering serves as a last resort to save cells if traffic management mechanisms fail to keep incoming traffic within the limits of the switch's resources. Considering cells are forwarded over an OC-3 link at a rate of 353,207 per second, even the largest cell buffers will last only fractions of a second before overflowing. You need to make sure sufficient switch resources and adequate service contracts are provisioned to ensure that cells do not reach the warning track that cell buffering provides.

There are several trade-offs when dealing with buffer size. Although large buffers can save more cells — and thus improve throughput — in a congestion situation, they require relatively expensive RAM and can increase cell delay because cells must spend more time in first in, first out queues.

Vendors use a variety of buffering methods and buffer sizes (see chart below). Switches from Digital, FORE, Hitachi, Olicom and Xylan have pools of buffers on each module that are dynamically allocated to ports as needed. Other switches, including those from Cisco, use a combination of dynamic and fixed buffers. Dynamic buffers offer greater flexibility in distributing needed buffers to the most oversubscribed ports.

Switches from FORE, Cisco and Hitachi offer two sophisticated buffer management schemes that can improve buffer efficiency, and in some cases, improve throughput in congestion situations.

The first scheme is intelligent packet discard, which takes into account where a cell comes from before discarding it. If one cell from a LAN

THE SWITCH SKINNY: VITAL STATISTICS OF TOLLY GROUP SWITCH STUDY PARTICIPANTS

	Vendor	3Com Corp.	Cisco Systems, Inc.	Digital Equipment Corp.	FORE Systems, Inc.	Hitachi Computer Products, Inc.	IBM	Madge Networks, Inc.	Olicom, Inc.	Xylan Corp.
	Switch	CoreBuilder 7000	LightStream 1010	GigaSwitch/ATM	ASX-200BX	AN-1000	8265 ATM Switch	Collage 740 ATM Switch	CrossFire ATM Switch	OmniSwitch with Xcell
	Software Version	3.5	11.2.5	2.5	4.3	02-00	3.2.0	1.2.7	1.10C	3.1.3
Category	Test									
Interface support	WAN interfaces	[OS-1, T-1, E-1, J2, OS-3, ES-3, Circuit emulation (supported on 3Com AccessBuilder)]	[T-1], E-1, OS-3, [E-3], Circuit emulation	[T-1, E-1, OS-3]	DS-1, T-1, E-1, J2, DS-3, ES-3, Circuit emulation	[T-1, E-1, J2, DS-1, OS-3, (E-3, Circuit emulation planned)]	[OS-1, T-1, E-1, J2, OS-3, E-3, Circuit emulation]	[T-1, E-1]	NS	[OS-1, T-1, E-1, J2, DS-3, ES-3, Circuit emulation]
	High-speed interfaces	OC-3, 155 UTP	25 UTP, OC-3, 155 UTP, OC-12	OC-3, 155 UTP	25 UTP, OC-3, 155 UTP, OC-12	OC-3, 155 UTP, OC-12	[25 UTP], OC-3, [155 UTP], OC-12	25 UTP, OC-3, 155 UTP	OC-3, 155 UTP, [OC-12]	[25 UTP], OC-3, 155 UTP, OC-12"
	LAN interfaces	10M Ethernet, Fast Ethernet, FDDI	10M Ethernet, token ring, FDDI	NS	10M Ethernet, Fast Ethernet, FDDI	NS	10M Ethernet, [Fast Ethernet, token ring, FDDI]	10M Ethernet, Fast Ethernet, token ring, FDDI	NS	10M bit/sec Ethernet, Fast Ethernet, token ring, FDDI
	Product providing LAN interface	CoreBuilder 2500, SuperStack II 2000	7500, Catalyst 5000	NS	FORE ES3810, PowerHub	N/A	8265	Madge SmartRing Switch, Collage 280, LEB200	N/A	Incorporated in OmniSwitch
ATM services	UNI 3.0/3.1/4.0	P/P/NS	P/P/P	P/P/[S]	P/P/NS	P/P/[S]	P/P/P	P/P/NS	P/P/P	P/P/NS
	UNI 3.X Autodetect/conversion	P/P	P/P	P/P	P/P	[S/S]	P/P	P/P	P/P	NS/NS
	P-NNI 1.0, [claimed levels of hierarchy]	P, [8]	P, [4]	NS	P, [2]	P, 1	P, 1	P, 1 (Prestandard)	P, [5]	P, 1
	UBR/CBR/VBR	P, P, NS	P, P, P	P, P, NS	P, P, P	P, P, P	P, P, NS	P, NS, NS	P, NS, NS	P, P, Testing in progress
	Total buffer size, in cells	1,800	16,000 per port	500 per module	27,468 per module	4,100 per module	1,300 per port	Not tested	32,323 per switch	Testing in progress
	Buffer allocation	Fixed	Dynamic + fixed	Dynamic	Dynamic	Dynamic	Fixed	Dynamic	Dynamic	Dynamic
	Per VC queuing	NS	P	[S]	P	P	P	NS	NS	NS
	Intelligent packet discard	NS	P	P	P	P	[S]	P	NS	NS
Performance	Throughput (G bit/sec)/ Number OC-3 ports tested	4.976/32	4.976/32	8.709/56	2.488/16	13.842/89	8.087/52	2.488/16	2.488/16	9.954/64
	SVC maximum call/sec	13	64	17	327	11	50	88	126	Testing in progress

P = Pass NS = Not Supported S = Supported Note: Results in [ ] were not verified. Complete results can be found at www.tolly.com.

packet is discarded, the whole packet likely will have to be retransmitted. Therefore, it's better to discard three cells that all come from the same LAN packet than cells from three different packets. Intelligent packet discard takes such matters into account.

The other scheme is per-VC queuing, which takes a similar tack on a stream level. When shipping cells out of queues, it uses a fairness algorithm to ensure that more cells would be dropped from an OC-3 bit stream than a competing 10M bit/sec stream, for example.

Our tests verified that both schemes effectively managed traffic flows as intended.

The upshot is you should look for switches that provide flexible dynamic buffering and a number of buffers sufficient to support the type of traffic you will run. Keep in mind that the more bursty or variable your traffic is, the more buffering you'll want. Any additional buffer management schemes are a definite plus.

Legacy LAN integration

Given its role as a backbone technology for legacy LANs, ATM switches have to support interfaces such as Ethernet, token ring and FDDI. These interfaces can be implemented in modules that plug into the switch or in external devices, such as a LAN switch or router that connects to the switch via an ATM uplink. In either case, LAN Emulation (LANE) software is required to allow communication between native ATM devices and legacy LANs.

There are three basic ATM services that offer backward compatibility for LANs: Classical IP (RFC-1577), LANE 1.0 and Multi-Protocol over ATM (MPOA), a superset of LANE that adds routing support. Because it is not yet widely implemented, MPOA was not tested for this study but will be in the future.

Classical IP and LANE are built around the idea of clients requesting connectivity from logical servers that hold databases of client ATM and LAN address mapping information. A client receives an ATM address for each requested LAN address and uses signaling to make a direct connection to each address. The difference between the two is that Classical IP works only with IP, whereas LANE supports multiple LAN protocols.

These integration services are another entry-level function for an ATM switch. Unless your switch runs in a pure ATM environment, such as in a high-powered WAN backbone, make sure it has LANE.

Consider Classical IP only if your network is entirely IP and the switch you favor does not support LANE. In the tests, the vendors that supported Classical IP were FORE, Olicom, Xylan and Hitachi, although each also supported LANE. There is no real advantage to Classical IP as compared to LANE, although there is one disadvantage — it doesn't offer native ATM routing between IP subnetworks.

LANE 1.0 doesn't offer routing either, although it does provide an upgrade path to MPOA, which supports LAN routing directly over ATM. MPOA incorporates LANE 2.0, which provides a bridging architecture along with functions such as redundancy and distributed services. That means you can have multiple LANE servers backing each other up and you can configure multiple servers to share the load in large networks. So make sure your ATM vendor offers MPOA or plans to in the near future.

LANE provides for encapsulation of 802.3 (Ethernet) and 802.5 (token ring) frames, but choosing which to employ is not a major concern. About the only reason to go with token ring is if you plan to maintain a large source route bridged network, which can't be supported via Ethernet encapsulation. Otherwise, 802.3 LANE can support data from any LAN interface, including FDDI and token ring. And many vendors, including FORE, IBM and Xylan, support 802.3 LANE frame sizes greater than 1,518 bytes, allowing larger token-ring frames to be easily transported over ATM.

In terms of LANE performance, the story is similar to that with SVC setup — it's only an issue at the beginning and end of a session, when PCs are activated and deactivated. LANE services are used to resolve a LAN MAC address to an ATM address. From then on, the endstation directly contacts its destination over a pure ATM link and can transfer data at line rate.

So the issue really comes down to capacity, not throughput: How many clients can a set of LANE services accommodate, and how long do you want to wait to log on in the morning or to reconnect after a failure? Make sure you follow your vendor's recommendations on how many users to assign to a particular emulated LAN (ELAN) or set of LANE services. With LANE 2.0, the issue should be alleviated with the help of redundant and distributed LANE services.

Bridging/routing

Keep in mind that LANE is only a bridging protocol. Like a virtual LAN implemented across multiple Ethernet switches, LANE essentially creates a bridged environment. To communicate between ELANs requires some form of routing.

As described above, MPOA will provide this routing mechanism. But as an interim solution, many vendors have utilized "one-arm" routers. The devices are essentially legacy LAN routers with an ATM interface. All data in this environment must pass through the one-arm device (see graphic, left).

Make sure vendors that do not presently provide standard MPOA or MPOA-like functionality at least provide a one-arm router. In our tests, we successfully verified that the one-arm routing mechanisms worked as advertised in most switches or switch/router combinations.

Of course, using "pure" ATM bridging and routing mechanisms — UNI and P-NNI, respectively — obviates the need for any other kind of routing. But the reverse is not true; MPOA and one-arm routers essentially act as feeders to the pure ATM routing mechanisms, which ultimately handle all traffic.

Although we've only discussed a sampling of the most important ones here, all the standards for fully functional ATM networks are in place, and our testing shows the majority of switch vendors offer corresponding implementations.

Vendors also have heard the knocks on ATM in terms of its complexity and are putting a more friendly face on their products, offering features such as default values for ATM addresses and LANE services. That wasn't the case a few years ago. Our testing didn't dispel the notion that there is still a learning curve involved in understanding the technologies comprising an ATM network, but the inherent wire-speed bridging and routing ATM provides may be well worth it.

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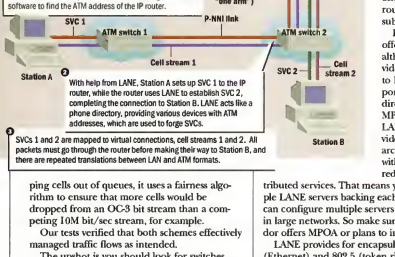
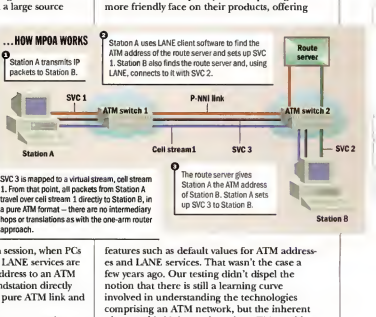




ENTERPRISE SERVERS

The faster pack

Compaq rises to the top of this year's enterprise server offerings.

By Jim Brown and Lee Schlesinger

This installment of our server review series shows that enterprise-class machines are getting significantly faster. In fact, all five servers we looked at this time were 10% to 42% faster than our previous top performer. Compaq Computer Corp.'s ProLiant 7000 turned in the best overall score with a reasonable price and consistently high numbers in testing under Windows NT Server 4.0 and Novell, Inc.'s IntranetWare 4.11. In terms of pure perfomance, Dell Computer Corp.'s PowerEdge 6100/200 squeaked past NeTpower, Inc.'s Sparta to close the year as our Windows NT Server 4.0 speed champion. However, Dell's last-place finish under IntranetWare dropped it to third place in overall performance. That left NeTpower on top of the performance list in a somewhat tainted victory: It was only tested under Windows NT because the vendor lacks IntranetWare support.

Speed isn't everything, though. Enterprise servers need redundant components, easy maintenance and bundled remote management capabilities. Each server in this roundup satisfies those needs to varying degrees, but Compaq once again came out on top with a highly scalable and easy-to-service unit.

ProLiant 7000

Vendor: Compaq Computer Corp.

Contact: (800) 345-1518, www.compaq.com/products/servers/pl7000/index.html

OVERALL SCORE	8.3
Performance **(30%)**	9
Features and flexibility **(30%)**	8
Management apps/features **(20%)**	8
Serviceability **(20%)**	8

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

Getting its subsystems to work together as a well-oiled machine keeps Compaq at or near the top of our performance charts. The firm's Netelligent network adapters and Smart-2 Array disk controllers helped the ProLiant 7000 keep up as we incrementally added clients to stress the I/O subsystems.

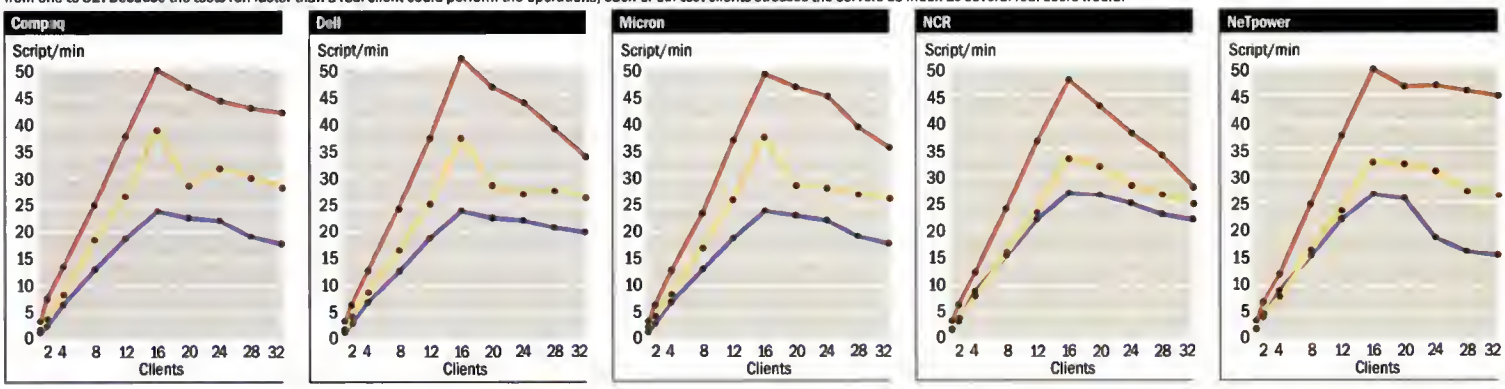
Our enterprise testing is designed to measure a server's peak performance at the 16-client level and gauge how an additional 16 clients, added in increments of four, slows it down.

The ProLiant 7000 took the second smallest performance hit as we went from 16 to 32 clients.

The ProLiant 7000 also was the most consistent performer in that its performance under NT and IntranetWare varied by only a tiny percentage. The unit also took top speed honors in Web server test-

PERFORMANCE SUMMARY

We measure performance from the client's point of view and report the time it takes to complete typical tasks. Our performance summary graphs show the results of each test in scripts per minute, with the number of clients ranging from one to 32. Because the tests run faster than a real client could perform the operations, each of our test clients stresses the servers as much as several real users would.



FILE SERVER Our file server tests run scripts on ascending numbers of clients for four applications: Microsoft Word and Excel for Windows, Lotus 1-2-3 for Windows and Corel WordPerfect for Windows. The scripts perform file access operations such as opening, importing and saving files.

DATABASE Our client/server database test uses Microsoft Access on the front end and Oracle Server 7.3 on the back end. We perform various read and write operations on a seven-table inventory management application.

WEB SERVER Our Web server test uses Netscape Enterprise Server 2.0 under Windows NT and Novell Web Server 2.51 under IntranetWare. We view pages containing text and graphics and use Open Text's Livelink Search 7.0 to search a 1G-byte document database in Windows NT.

ing, but only by a small margin.

Besides good performance, Compaq provides innovative design. A trapdoor on the top of the server provides access to five hot-plug PCI slots for easy service. Using Compaq's Hot-Plug software to turn off power to an individual slot, you can replace a faulty card without halting the server. Removing the server's top panel provides access to four more PCI slots and two EISA slots.

The only blot on the service picture is the seven Seagate Technology, Inc. ST34371WC drives that populate the 15 available bays. While hot-swappable, they're difficult to unlatch for removal.

Compaq also delivers on the manageability front, providing a number of options. The unit comes with Insight Manager 3.4, Compaq's server management software, plus a remote management module that enables administrators to dial in to, diagnose and repair server problems.

PowerEdge 6100/200

Vendor: Dell Computer Corp.

Contact: (800) 388-8542, www.dell.com/store/index.htm

OVERALL SCORE	7.3
Performance (30%)	8
Features and flexibility (30%)	7
Management apps/features (20%)	7
Serviceability (20%)	7

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

Dell's unit is a marked contrast to the ProLiant 7000, showing the company has yet to perfect its high-end offering. Where the ProLiant 7000's performance under NT and IntranetWare differed by a few percentage points, the PowerEdge 6100/200 showing under IntranetWare was only 77% that of its NT performance.

The unit also fared poorly when it came to keeping up as the client count went beyond 16. Overall performance with 32 clients was only 71% that of its results with 16.

While we were testing the unit, Dell came out with new interleaving memory that it says improves performance by 10%. But when we tried the new memory module in rerunning file server and database tests at the 16-client level, we saw a small drop in performance.

On top of beefing up performance, Dell needs to make its enterprise offering more scalable. The PowerEdge 6100 had the lowest storage capacity of the units we tested, with just six slide-in hard-drive bays.

The drives in the unit we tested were set up in a RAID 0 configuration using Dell's PowerEdge Expandable RAID Controller. Dell built on top of American Megatrends, Inc.'s controller to offer a way to automatically rebuild a RAID configuration when drives are swapped. Other RAID controllers force you to make changes in BIOS settings before a new RAID configuration can be built.

To keep down the cost of its enterprise offering, Dell offers its Server Monitor Module for remote management as an option. The module enables you to access, diagnose and reboot a remote server regardless of the operating system it is running. Otherwise, you manage the PowerEdge 6100/200 using the bundled Intel Corp. LANDesk 2.52 software and diagnose it with Dell's diagnostic aid disk.

NetFrame NF9008

Vendor: Micron Electronics, Inc.

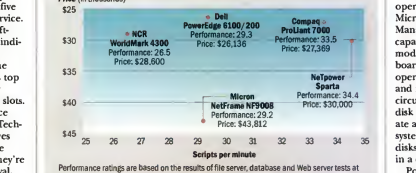
Contact: (800) 642-7667, www.netframe.com/technology/9000/9008/data.htm

OVERALL SCORE	7.6
Performance (30%)	8
Features and flexibility (30%)	8
Management apps/features (20%)	7
Serviceability (20%)	7

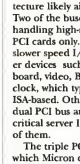
Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

PRICE/PERFORMANCE COMPARISON

The Compaq ProLiant 7000 offers the best value in this crop of enterprise servers.



Performance ratings are based on the results of file server, database and Web server tests at the 32-client level. For these workgroup servers, results are weighted according to the following percentages for each test: file server, 30%; database, 60%; and Web server, 10%.



In the performance derby, this unit finished fourth, right on the heels of Dell's. However, the NF9008 performed more consistently than the PowerEdge 6100/200 across NT and IntranetWare. It posted an NT score of 31.8 scripts per minute and an IntranetWare score of 26.6, for an average of 29.2. Dell did better in NT, with a score of 34.9 scripts per minute, but faltered in IntranetWare with a score of 23.8, for an average of 29.3.

The unit's triple PCI bus architecture likely aided performance. Two of the buses are dedicated to handling high-speed traffic from PCI cards only. The other handles slower speed I/O for critical server devices such as the mouse, keyboard, video, BIOS and real-time clock, which typically are EISA- or ISA-based. Other vendors use a dual PCI bus architecture and mix critical server I/O traffic onto one of them.

The triple PCI bus architecture, which Micron calls firewalled I/O, originally was designed as a redundancy feature. When one PCI bus fails, traffic is redirected to the bus that handles critical server I/O, which results in the NF9008 falling back to the type of dual PCI bus architecture used in other servers. The NF9008 also supports hot-plug PCI technology. But while Compaq is limited to five slots, Micron supports eight.

With Micron's MultiSpan feature, you can pool several network interface cards (NIC) in the NF9008 into one logical unit on the same LAN segment. When any one NIC fails, the others load-balance the traffic.

When the server encounters operational problems, you can use Micron's Maestro Recovery Manager remote management capability. With it, you use a null modem connection to the system board to remotely monitor server operations, diagnose problems and reboot. Thanks to a separate circuit breaker switch, fans and disk drives will continue to operate as you shut off power to the system board, a plus if the server's disks are in use by another server in a cluster configuration.

Positioned as a general-purpose server, the NF9008 was designed by NetFrame Systems, Inc., which recently was purchased by Micron.

WorldMark 4300

Vendor: NCR Corp.

Contact: (800) 225-5627, www.ncr.com/product/integrated/pages/4300.htm

OVERALL SCORE	7.0
Performance (30%)	7
Features and flexibility (30%)	7
Management apps/features (20%)	8
Serviceability (20%)	6

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

Although it has the same chassis and NT-only configuration as the NetTower unit, NCR's offering came in at the other end of the performance spectrum — last. The unit turned in good numbers in the 16-client database test, trailing NeTpower by just 3%. But by the time 32 clients were added, NCR's performance dipped to 55% behind NeTpower's.

Overall, the WorldMark 4300's performance at the 32-client level dipped to 70% of the 16-client level. At NCR's request, we did not test the server under IntranetWare. The company says it does not resell Intra-netWare and thus has not optimized any of its subsystem drivers for it.

NCR didn't fare much better in other areas. The internal geometry and the 12 screws used to secure the server's case makes this one of the more difficult servers to service.

While the WorldMark 4300 we tested came with four processors, the chassis is big enough to fit

ENTERPRISE SERVERS: THE INSIDE STORY

	Compaq Computer Corp.		Dell Computer Corp.		Micron Electronics, Inc.		NCR Corp.		NetTower, Inc.	
Model	ProLiant 7000		PowerEdge 6100/200		NetFrame NF 9008		WorldMark 4300		Sparta	
Processor	4 200-MHz Pentium Pros with 512K-byte Level 2 cache		4 200-MHz Pentium Pros with 1M-byte Level 2 cache		4 200-MHz Pentium Pros with 1 M-byte Level 2 cache		4 200-MHz Pentium Pros with 512K-byte Level 2 cache		4 200-MHz Pentium Pros with 512K-byte Level 2 cache	
Max. processors	4 200-MHz Pentium Pros with 3M-byte Level 2 cache		4 200-MHz Pentium Pros with 1M-byte Level 2 cache		4 200-MHz Pentium Pros with 1M-byte Level 2 cache		B 200-MHz Pentium Pros with 1M-byte Level 2 cache		4 200-MHz Pentium Pros with 1M-byte Level 2 cache	
Memory	**As tested**	**Maximum**	**As tested**	**Maximum**	**As tested**	**Maximum**	**As tested**	**Maximum**	**As tested**	**Maximum**
	256M bytes	4G bytes	256M bytes	4G bytes	256M bytes	4G bytes	256M bytes	4G bytes	256M bytes	4G bytes
Slots	**Provided**	**Open**	**Provided**	**Open**	**Provided**	**Open**	**Provided**	**Open**	**Provided**	**Open**
EISA	2	2	4	4	0	D	4	4	4	4
PCI	5 Hot Plug, 4 non-Hot Plug	3 Hot Plug, 3 non-Hot Plug	6	1	8	2	6	0	6	D
Bays	**Provided**	**Open**	**Provided**	**Open**	**Provided**	**Open**	**Provided**	**Open**	**Provided**	**Open**
Internal/External	24	15	10	2	11	2	17	1D	17	1D
Hot-swappable	18	11	6	D	9	1	12	6	12	7
Storage										
Adapter	Compaq STI4371WC		Adaptec AIC-7880		QLogic Ultra Single Ended QLA1040		Adaptec AHA-2944W		Adaptec AIC-7880	
Bus	Ultra Wide SCSI		Ultra Wide SCSI		Ultra Wide SCSI		Fast Ultra Wide SCSI		Ultra Wide SCSI	
Model	4G-byte Seagate Barracuda		2G-byte Seagate ST32171		8G-byte Seagate Barracuda		4G-byte Seagate ST34572		4G-byte Seagate Barracuda	
Drive capacity	**As tested**	**Maximum**	**As tested**	**Maximum**	**As tested**	**Maximum**	**As tested**	**Maximum**	**As tested**	**Maximum**
	24G bytes	109G bytes	12G bytes	54G bytes	64G bytes	72G bytes	24G bytes	108G bytes	20G bytes	108G bytes
CD-ROM	Sony 16X IDE ATAPI		NEC CDR 141D 8X SCSI		Toshiba XM-5701B 12X SCSI		Toshiba XM-5701B 12X SCSI		Toshiba XM-3701B 8X SCSI	
Network adapter	Compaq Netelligent Dual Port 10/100		Intel EtherExpress Pro 10/100B		Intel EtherExpress Pro 10/100B		SMC 9334BDT		Intel EtherExpress Pro 10/100B	
Fault-tolerance features	ECC memory; RAID; redundant processor power modules, power supplies, fans and network adapters; Hot Plug PCI; pre-failure alerts		ECC memory; RAID; hot-swappable power supplies, fans and hard drives		ECC memory; Hot Plug PCI; hot-swappable hard drives, fans and power supplies		ECC memory; hot-swappable hard drives; redundant fans; RAID		ECC memory; hot-swappable hard drives; load-balancing power supplies; temperature and voltage sensors	
Security features	Lockable chassis; power-on, keyboard and administrator passwords; diskette drive and boot control; parallel and serial interface control; disk configuration lock		Lockable hard drive bays and chassis; BIOS password		Chassis lock; BIOS and system passwords		Front and rear panel padlocks; monitor security; password protection		Lockable front and side panels; BIOS password; front and side panel intrusion detection switches	
Bundled software	Microsoft Windows NT Server 4.0; Novell IntranetWare 4.11; Compaq SmartStart 3.41; Compaq Insight Manager 3.40; Rack Builder 3.50		Windows NT Server 4.0; Intranet-Ware 4.11; intel LANDesk Server Manager 2.52		Windows NT Server 4.0; Intranet-Ware 4.11; Maestro Centrsi and Maestro Recovery Manager; IntraPulse environmental monitor		Windows NT Server 4.0; NCR Remote Server Manager; NCR 4300 CO Platform; NCR ValuePlus CO for BackOffice		Windows NT Server 4.D; LANDesk Server Manager 2.52; customer-specific packages available	
Warranty	Three-year limited warranty		One-year full warranty, three-year warranty on parts only; optional five-year warranty		Five-year warranty on processor and memory; three-year warranty on all other components		One-year limited warranty with two-year extension option		Three-year warranty	

four more. In fact, while we were testing the 4300, NCR introduced the eight-processor 4380, which uses the same chassis.

A plus for NCR is an impressive remote management capability that is shipped standard. This feature includes a modem and diagnostic processor board that enables you to remotely access, diagnose, troubleshoot and reboot the server. Technicians at the server site can tap into the diagnostic processor via a LAN port or a serial interface.

Sparta

Vendor: NetTower, Inc.

Contact: (800) 801-0900, www.nettpower.com/products/servers/sparta.html

OVERALL SCORE	7.7
Performance (30%)	9
Features and flexibility (30%)	8
Management apps/features (20%)	7
Serviceability (20%)	6

Scores are based on a scale of 1-10. Percentages are the weight given to each category in determining the overall score.

This server is designed to support high-volume transaction processing in NT environments, and it shows. Sparta came out on top in our NT database test and finished second in NT Web server testing, coming in just behind Compaq. The server took only a 9% performance hit as we added clients in the database test, the smallest dip of all servers tested and a testimony to its transaction processing design. The performance dip as we added clients in Web server testing was 17%, the lowest of all in this category.

However, Sparta was the poorest performer in the NT file server test. While Sparta was in the middle of the pack at the 16-client level, it fell far behind the others by taking a 42% hit by the time it got to 32 clients.

We didn't test Sparta under IntranetWare because NetTower doesn't offer it as an option. Instead, four years ago, the company decided to focus on Windows NT.

By licensing the NT source code from Microsoft, NetTower is able to work with its subsystem suppliers and customers to fine-tune the operating system for top-notch performance.

Even though it has the source code, NetTower says it does not make major alterations to it. Instead, it reports problems it uncovers along with suggested fixes to Microsoft and implements workarounds to problems NT has with various subsystems until the problem is addressed.

NetTower is an Intel design partner too, which enables it to have a say in how newly designed subsystems can be integrated into its unit. The company says it will also help customers integrate other third-party-supplied subsystems into Sparta.

Sparta comes up a little short in the remote management area, offering an optional Intel product that enables you to dial in and remotely repower the box. ■

Go online for an expanded version of this review and to download copies of complete server results plus information about our methodology.

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Network Engineer

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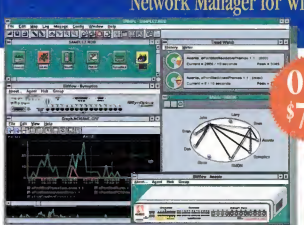

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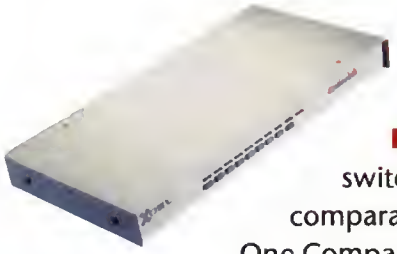

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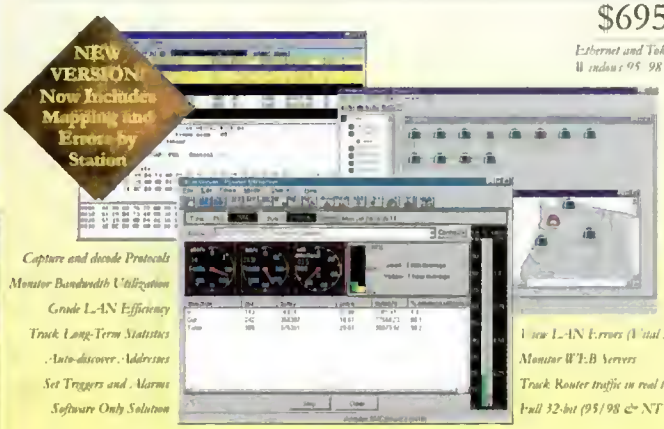

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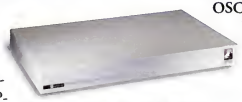

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IE

Continued from page 1

of their way to remove these components and render their networked Windows 95 machines inoperable.

Microsoft's somewhat idle threats are a reaction to the injunction requiring the company to provide PC manufacturers with a version of Windows 95 that is free from any browser functionalities. Microsoft says it will now offer OEMs a choice of how they want Windows 95.

The OEMs can choose to continue to license a bundle containing the most recent updates of the operating system and the browser; receive a version of Windows 95 without any IE files which therefore will not boot; or take an older version of Windows 95 that hardly will be affected by removing IE files.

As Microsoft took measures to comply with the injunction, the company appealed the legality of the order. But the Department of Justice fired back, calling Microsoft's proposed compliance "commercially worthless" to OEMs. The Justice Department again asked the court to hold Microsoft in civil contempt and levy a fine of $1 million per day.

Cutting through the FUD

Despite all the legal bickering, corporate nets should remain largely unaffected.

First of all, no OEM has come forward to say it will ship computers with either the stripped down or older versions of Windows 95, according to Microsoft spokesman Adam Sohn.

Second, the court case has no bearing on how Microsoft licenses Windows 95 and IE directly to corporations.

Third, tests conducted by the *Network World* lab and individual users demonstrated that getting rid of most of the IE files from a Windows 95 machine has no effect on the operating system.

"I've uninstalled IE 3.02 four times in the last month without any residual problems with Windows 95," said Fred Towery, a network instructor at San Jacinto College in Houston.

The *Network World* tests revealed that running a simple Windows uninstall program will remove IE 3.02 and 4.0 executable code. However, the program leaves intact a series of dynamic link libraries (DLL) that affect the booting process and how the operating system recognizes Web-based features of some applications.

Windows 95 product manager Shannon Purdue confirmed that the only way to completely disable the operating system would be to manually delete all the DLLs that the court has defined as being tied to IE.

Further, *Network World* testing showed that after using the command line to remove one specific DLL, COMCTL32.DLL, the operating system was unable to reboot. This DLL provides support for such basic Windows 95 components as toolbars and start-up menus.

While Microsoft originally had shipped COMCTL32.DLL as part of the operating system, older, so-called Classic Pentium chips, which lack the MMX multimedia instruction set, are selling for about $100. "They need to bring the price of the processor down from where it is now and [reduce] the cost of the entire platform," Henry said.

Boundless Technologies, Inc. uses the 5x86, an Intel clone from Advanced Micro Devices, Inc., of Sunnyvale, Calif., in its Viewpoint TC product line. "It's about $40, and it gives us Pentium-class performance," said Michael Stebel, vice president of global marketing at Boundless, of Austin, Texas.

Intel officials insist their thin-client packages will be competitive. "If you're asking do I understand this is a price-sensitive market, the answer is, 'yes,'" said Ron Peck, Intel's director of net client marketing. ■

The Microsoft two-step

Microsoft now updates Windows 95 with different versions of Internet Explorer. Web-related applications rely on DLLs shipped with IE 2.0 and 3.0. A successful boot of the machine requires COMCTL32.DLL, which is not officially in Windows 95 OSR 2.0 or 2.5, but in IE 3.0 and 4.0.

Ship date	Operating system and applications	Browsers and accompanying DLLs
Aug. '95	Windows 95 COMCTL32.DLL provides support for menus and tool bars	IE 1.0
Nov. '95		IE 2.0 URLMON.DLL allows developers to work with URLs
Aug. '96	Windows 95 OSR 2.0	IE 3.0 WININET.DLL retrieves data using IP SHADOCVW.DLL adds browser functionality to programs MSHTML.DLL enables software products to display HTML COMCTL32.DLL update
Feb. '97	Office 97	
Oct. '97	Quicken 98 Lotus Notes 4.6	IE 4.0 COMCTL32.DLL update
Dec. '97	Windows 95 OSR 2.5	

Intel

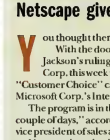
Continued from page 1

what it calls lean-client devices. To fuel the devices, Intel is reaching into its embedded systems group, to which the aging Pentium has been relegated as the Pentium II sales skyrocket, for cheap chips.

Intel has a lot of catching up to do. Only one of the prominent thin-client vendors is using an Intel chip. That is the i960 Reduced Instruction Set Computing processor, not one based on the Pentium-style architecture. Prices for today's thin clients typically range from about $600 to $1,200. But Intel's flagship Pentium II, at 233 MHz, is priced to OEMs at about $370, according to Kelly Henry, senior analyst for semiconductors at International Data Corp., of Framingham, Mass. Even the

THIN-CLIENT VENDORS RELY ON LOW-COST INTEL RIVALS FOR CPUS

Intel's chips are too costly for vendors of Java network computers and Windows terminals. The chip maker will have to cut prices for its Pentium processors, add needed management features, or both.



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Netscape gives IE users a hard sell

You thought there was a browser war before?

With the door opened by U.S. Judge Thomas Penfield Jackson's ruling last week, Netscape Communications Corp. this week will announce its plans to implement a "Customer Choice" campaign to convince end users to ditch Microsoft Corp.'s Internet Explorer (IE).

The program is in the testing phase but will commence in "a couple of days," according to Mike Homer, Netscape's executive vice president of sales and marketing.

Netscape has what it calls "IE switchers" dispersed around the Internet that, in Homer's words, "prod" the user with the fact that there is a choice in browsers. In a static presentation to the press, one Web page was shown that featured a banner reading, "You're free to choose Netscape Communicator." The page also included the image of a ball and chain with the leg cuff opened as if a prisoner was recently released.

In one *Network World* visit to Netscape's site, the Web server detected the use of IE, brought up a screen with the banner, "Break Free!" and offered to dole out more information or the opportunity to download the Netscape browser. The page also displayed a sardonic title: "Don't Be Tied Down By… Microsoft Internet Explorer."

A "No thanks" button also was provided. If activated, a later page said the button would trigger a cookie file that would keep the ad from returning. Otherwise, the ad would continue to appear on a random basis.

—Andy Eddy

Further, *Network World* testing showed that after using the command line to remove one specific DLL, COMCTL32.DLL, the operating system was unable to reboot. This DLL provides support for such basic Windows 95 components as toolbars and start-up menus.

While Microsoft originally had shipped COMCTL32.DLL as part of the operating system, the company recently has used IE as the vehicle to upgrade the software. Microsoft created this dependency because the company "views IE as an operating system update," Sohn said.

Aside from COMCTL32. DLL, there are four other DLLs that, if deleted via command line scripting, will have some effect on Web-based applications.

However, Sohn indicated that independent software developers can prevent complications by building these DLLs into their products.

As for online services, the removal of IE can affect how users initially connect to CompuServe, America Online or The Microsoft Network.

The extent of the effect depends on how IE is removed from the Windows 95 PC, said Randy Raynak, director of application development at CSI, CompuServe's online services division. If an OEM uninstalls IE 3.X from a PC, the desktop will not have an Internet icon. But if the user goes into the online folder and clicks on a CompuServe icon, the user should still be able to sign up for the service, Raynak said.

Network World senior writer Denise Pappalardo and test center director Lee Schlesinger contributed to this article.

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—Andy Eddy

Radio Backspin — interview with Santa

MG: Hi, I'm your host, Mark Gibbs, and you're listening to Radio Backspin. On today's show we have with us none other than Santa Claus himself. Welcome Santa.

SC: Glad to be here. Oh, and ho, ho, ho.

MG: So Santa, tell us what Christmas is looking like this year.

SC: Well Mark, it's the biggest ever. World population has grown 10% and processing the Naughty and Nice List is a bigger job than ever.

MG: Before we discuss your MIS operation, I'd like to talk about how you deliver presents. First, how many children are on your list?

SC: Well, there are around two billion children in the world, but since the Muslim, Hindu, Jewish and Buddhist children aren't involved, I only have to deal with around 15% of the total, call that 378 million. According to the latest census, there are approximately 3.5 children per household, so that's around 91.8 million homes I visit. Most of those homes have at least one good child.

MG: How fast do you travel?

SC: Well, thanks to the international date line and time zones and so on, I have about 31 hours to work with. This means that I have to make 822.6 visits per second, which is around 1/1000th of a second for each house.

In terms of distance traveled, if the 91.8 million stops are distributed evenly around the earth (which, of course, we know to be false but for the purposes of our calculations we will go with it), we are talking about something like 0.78 miles between each household. That is a total trip of 75.5 million miles, not counting stops to do what most of us must do at least once every 31 hours. This means my sleigh is moving 650 miles per second — that's 3,000 times the speed of sound. It is no wonder I've got such rosy cheeks.

MG: With the skies so crowded these days with commercial traffic, isn't it kind of dangerous up there?

SC: Well, you know Mark, I am a licensed pilot. In fact, I just got a visit from the Federal Aviation Administration. They came last week for my pre-Christmas flight check. The examiner was very thorough — he checked everything: the reindeer harnesses, the landing gear, even Rudolf's nose. He reviewed my weight and the balance calculations for the sled's payload and finally we were ready for the check ride. We got in, I fastened my seatbelt and it was then I realized that the examiner had a shotgun with him. "What's that for?!?" I asked. The examiner winked and said, "I'm not supposed to tell you this ahead of time, but you're gonna lose an engine on takeoff."

MG: So, who has been naughty and who has been nice in the network industry?

SC: Hmmm, let's see . . . Bill Gates has been naughty this year . . . er, Larry Ellison's been mostly naughty, and Scott McNealy has been very naughty (those tweaked JVM performance results) . . . um, well, it looks like almost everyone has been naughty. I wonder if I have enough lumps of coal to go 'round?

MG: So tell us, how do you process a list of 378 million names, manage the huge toy production volume and handle all the other aspects of running the biggest integrated manufacturing and distribution system in the world? I'd guess you're outfitted with something pretty powerful.

SC: Well Mark, our mainframe . . .

MG: Ooops, I'm sorry Santa, we're out of time. I'd like to thank Santa for joining us today. Catch us next time, when we'll be interviewing God and asking the question, "What is the meaning of life?"

Merry Christmas to all our readers. Send a virtual Christmas card to and get one back from nwxmas@gibbs.com. (Santa calculations borrowed from SPY magazine, *January, 1990.)*

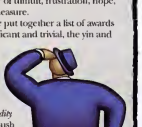
'NET BUZZ

The latest on the Internet/intranet industry

By Chris Nerney

THE YEAR THAT WAS What can be said about 1997, other than it's not divisible by three? If you follow the Internet, it was a year of tumult, frustration, hope, fear and a few deadly sins thrown in for good measure.

If that doesn't make sense of it for you, we've put together a list of awards we think highlight the best and worst, the significant and trivial, the yin and yang of 1997.



The *Attorney Full Employment Act of '97 Award:* **Microsoft,** whose aggressive — some say monopolistic — business practices generated more court time than the **National Basketball Association.**

The *In Like a Lion and Out Like a Cheap Commodity Award:* Push technology. Last year at this time, push was touted as the Next Big Thing. Now the few push vendors that remain don't even like to use the word.

The *Now I Have Bill Gates Where I Want Him Award:* To **Steve Jobs,** who craftily repositioned down-and-out Apple Computer from vanquished Microsoft rival to Microsoft supplicant — oops, we meant "partner."

The *Endless Adolescence Award:* Sun CEO **Scott McNealy,** whose nonstop stream of juvenile jabs directed toward Redmond almost makes you want to root for Billionaire Bill.

The *Clowntime Is Over Award:* **Eugene Kashpureff,** whose attention-getting theatrics aimed at making him a player in the Internet Domain Name System (DNS) gold rush finally got him into trouble.

Kashpureff was arrested two months ago in Canada on U.S. wire fraud charges stemming from his brief hijacking in July of the Web site run by **InterNIC,** which contains the master database of Internet URLs. Creator of the **AlterNIC** domain registry, Kashpureff said he was protesting the monopoly on domain name registration held by **Network Solutions, Inc. (NSI),** the private company that has been running InterNIC under an agreement with the National Science Foundation.

The *C'mon, This Isn't Waco Award:* The **FBI,** which is pursuing felony charges against Kashpureff, a father of four with no money and, admittedly, not a whole lot of common sense. Look, we're not fans of the guy, but he didn't cause any damage, and NSI made him say he's sorry. Let it go.

THE YEAR THAT WILL BE Of course, no decent year-end column would be complete without a peek into the future. Here are six official *'Net Buzz* predictions for 1998:

■ **Cisco Systems,** stepping up the pace of its acquisition frenzy, accidentally buys itself.

■ **America Online (AOL)** admits that the millions of CDs mailed to prospective users actually are just one CD ensnared in an insidious chain letter scheme.

■ White House Internet expert **Ira Magaziner** settles DNS controversy and declares there will be just one top-level domain — .ira.

■ While off giving yet another trade show keynote speech, Marimba CEO **Kim Polese** learns that the company actually went out of business several months before. Bookings continue unabated.

■ **Bandwidth problem** permanently solved through synergistic application of duct tape, baking soda and flubber.

■ Electronic commerce migrates to use of Toys R Us **Geoffrey dollars** as solution to Internet's economic model.

■ Reluctant to damage his image, O.J. Simpson attorney **Barry Scheck** rebuffs request by Internet spam king **Sanford Wallace** to represent him in string of lawsuits.

We challenge you to save these predictions and grade us next December on accuracy, sincerity and permanship. Until then, keep giving us your best Internet- and intranet-related news. Contact Chris Nerney at (508) 820-7451 or cnerney@nwxw.com. Happy holidays.

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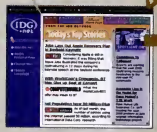

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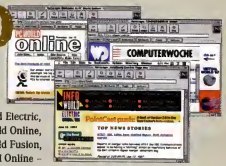

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